TECHNOLOGY DEPT.

# Telephone ENGINEER and MANAGEMENT

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FEBRUARY, 1946

**TELEPHONE ENGINEERS ENLIGHTENED AT RADIO CONVENTION**

*By B. C. Burden*
*Technical Consultant*

*Editorial Index page 10*

THE COVER PICTURE—

This section of the Alaskan Highway telephone line is many miles from the highway in order to shorten the distance and inaccessible to tree-clearing tractors. Linemen repair and patrol sections like this on foot with snowshoes and loaded down with tools. Giant trees were felled to remove operating hazards when the pines, laden with snow, bent toward the line. U. S. Signal Corps photo, 843rd Sn.

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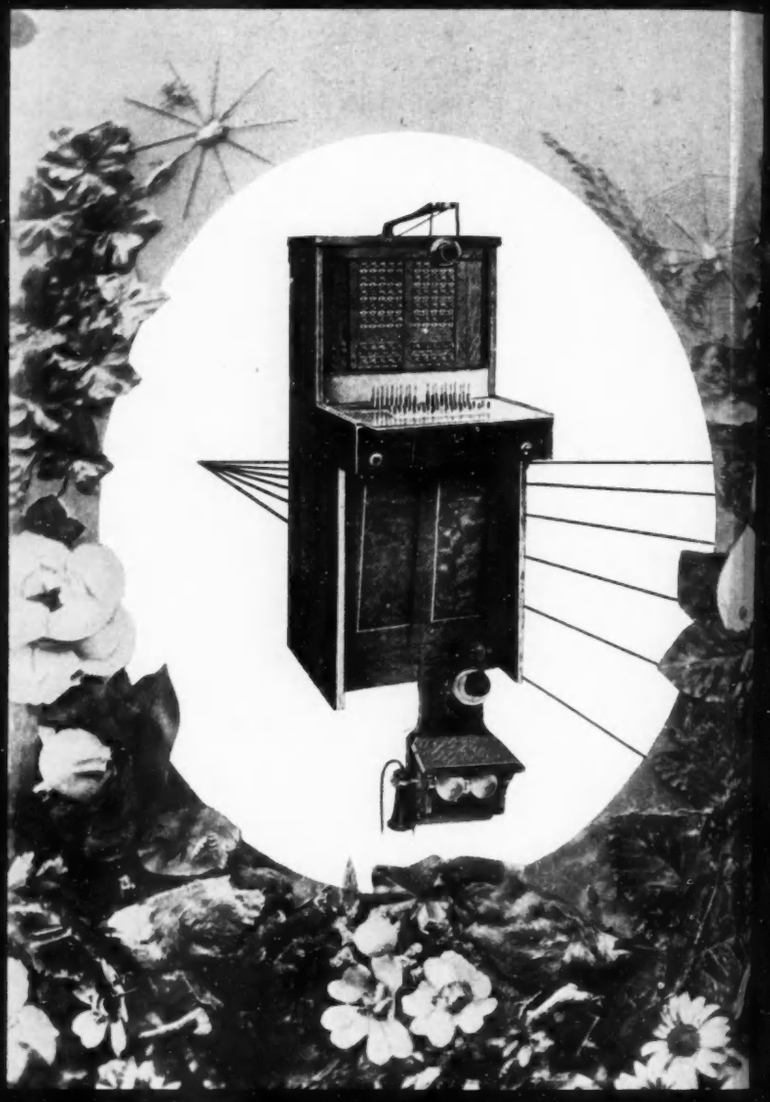
THE MAGAZINE OF THE TELEPHONE INDUSTRY

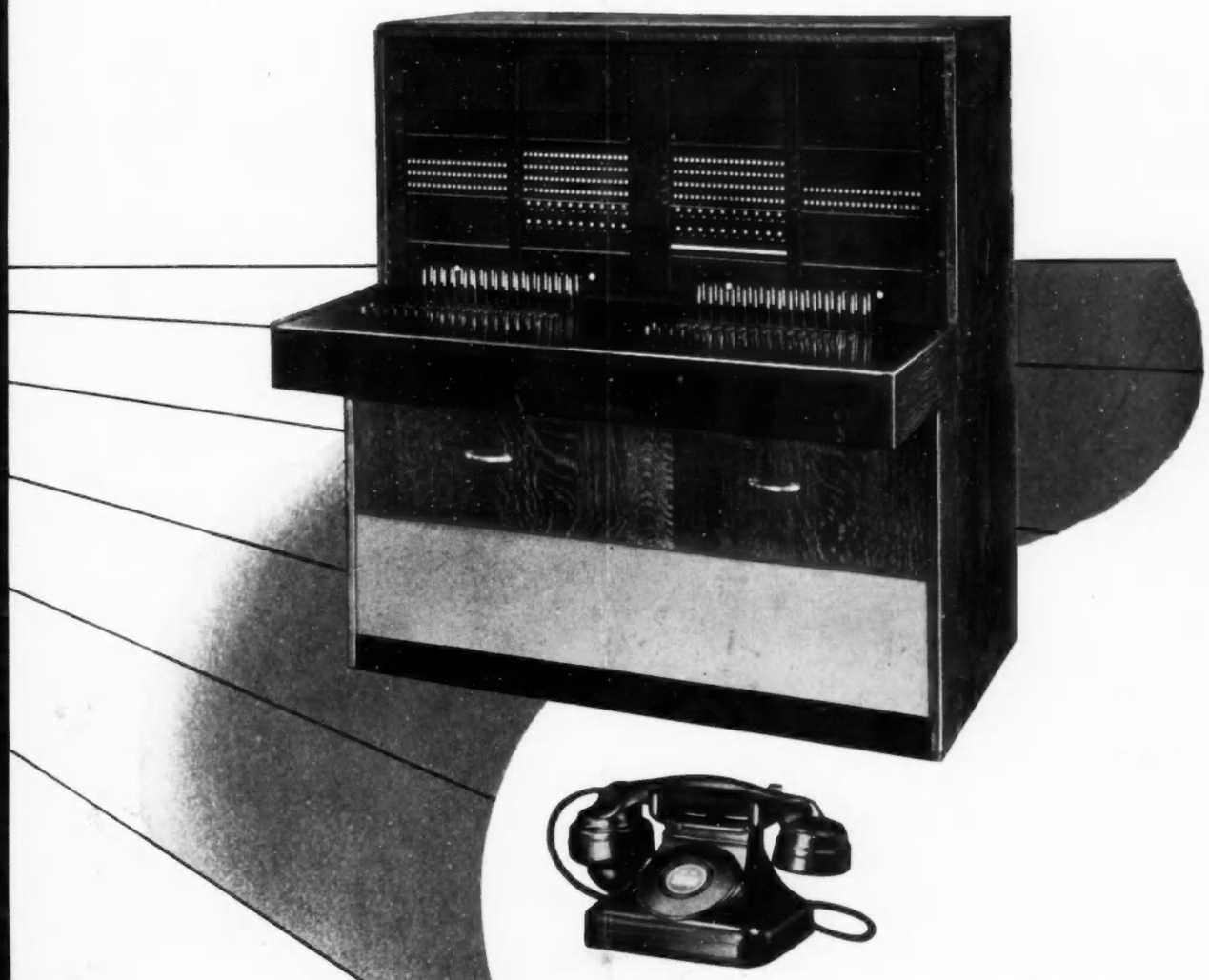
# LEICH'S RECORD IN THE "GONE BY DAYS" CARRIES AN IMPORTANT MESSAGE FOR YOU



Leich MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 19

How frequently telephone men have considered the long life of Leich equipment and said, "You build too well; your equipment continues to operate long after it is outmoded by your more modern designs."

Looking back at the longevity of Leich telephones and switchboards, this might appear to be true. Yet, what is usually overlooked is that this long life is only a "by-product" of Leich design.



Fundamentally, Leich equipment is designed to "cost less to own." It is constructed to operate day-after-day, year-in and year-out without expensive maintenance and, more important, without worry to the operating man. That it lasts so long is just an added feature.

Leich equipment has been built that way for 39 years. It is built that way today. For maintenance economy; for freedom from operating difficulties; for continued satisfaction long after the purchase is forgotten, specify "Leich." Just address your inquiries to Leich Sales Corporation, 427 W. Randolph St., Chicago, Illinois.

# *Here It Is!*

AN OUTSTANDING ACHIEVEMENT

IN CURRENT TELEPHONE HISTORY

*The New*
**KELLOGG**
1000 SERIES
MASTERPHONES

**Completely New Inside and Out with Improved Design and Operating Features that Will Save You Time and Money**

In the new Kellogg 1000 Series Masterphones we are offering telephone men what we sincerely believe to be the greatest values in telephones ever offered. We know you'll agree when you see them.

You'll see, for example, that the new Kellogg Masterphone is so easy to adjust and service and so simple to install that the only tool you will need is a medium-sized screwdriver.

You'll see that a *single* base plate and two housings give you a choice of either desk or wall telephones for all types of subscriber service.

You'll see that all components are mounted on this base plate for instant accessibility and quick-as-a-wink inspection.

You'll see that all you need to do to replace the condenser is to lift it from a socket and plug in another; and that it's just as easy to replace the induction coil.

You'll see that the entire circuit (a completely new and improved antiside tone Triad Circuit) is permanently wired and nested within the interconnecting block.

You'll see an exterior with modern-as-tomorrow styling and graceful lines.

When you see all these and realize that they are only the highspots in a telephone that's literally packed with other time and money saving features —then you'll see what we mean when we say: "You'll be wise to insist on the new Kellogg Telephones."

We are bending every effort to make these new telephones available to you at the earliest possible date. If you are not yet booked for an initial order, by all means ask your Kellogg representative for a thorough demonstration. See for yourself that you'll be time and money ahead for many years to come by standardizing on the new Kellogg Masterphones.

**KELLOGG SWITCHBOARD & SUPPLY COMPANY**
6650 South Cicero Ave., Chicago 38, Illinois

## UTMOST SIMPLICITY

**Ease of Assembly**

All components can be quickly assembled or removed. Induction Coil Condenser and Dial Cord each plug into the interconnecting block like tubes into your radio. Ringer can be removed by simply unscrewing two screws—interconnecting block by unscrewing three screws. There is no complex wiring to disconnect and re-solder, no color code to remember.

**Unit Construction**

Induction Coil and Universal Condenser are each encased and sealed as individual units. Interconnecting block is also a single molded unit. It is used to house all permanent connections and to provide the means for mounting or connecting all components.

## UNIVERSAL APPLICATION

**Induction Coils**

A single common battery induction coil, in conjunction with a simple 3-way switching unit makes it easy to control transmission, reception and side-tone for long or medium loops and also controls transmitter current supply on short loops. For local battery service a local battery induction coil is inserted in place of a Common Battery coil.

**Universal Condenser**

A single condenser in conjunction with a simple 2-way switching unit furnishes capacities to satisfy all circuit applications. You stock only one type of condenser unit for all uses.

**Universal Circuit**

The permanently wired circuit is a stamped grid nested in the underside of the interconnecting block. All essential terminations are on the top of the block in the form of either screw connectors or pin jacks. These terminals, in conjunction with three switching units make it simple to adapt the circuit to a wide variety of applications.

## RELIABILITY OF OPERATION

**Non-positional Transmitter**

The new Kellogg feltless transmitter has improved non-positional qualities, is designed to provide improved response throughout a wide range of applied voltages and is reliable in operation under varying temperature and humidity conditions.

**"Floating" Ringers**

Rigid ringer frame with a new flexible metal mounting will keep ringer in permanent adjustment and also provide high output of pleasing quality from the large two-tone gongs.

**Protected Circuit**

Permanently nested in the interconnecting block, is the universal circuit and its associated switching springs. Both are protected against moisture, dust and bugs. No changes need ever be made in the physical circuit itself—the only circuit elements used being located on the top of the block.

**Improved Receiver**

Receiver is designed to furnish improved high-fidelity response.

New plug-in type, bakelite encased induction Coil.
New plug-in type, bakelite encased universal Condenser.
New bakelite interconnecting block.
New easily adjusted ringer.
New universal base plate.

# The Lid is Off!

***Look at the outstanding advantages shown in this "Exploded View" of the New KELLOGG 1000 Series Masterphone***

## ECONOMY

**Low Installation Cost**

The new telephone is so easy to install that a medium size screwdriver is the only tool needed to remove or replace a housing, or make any needed adjustment or adaptation.

**Low Maintenance Cost**

With installation so easy and servicing so simple—with no complicated color codes to slow up work—with no soldering or unsoldering necessary in the field—telephones can be installed or restored to service rapidly, increasing subscriber good-will and decreasing maintenance costs.

**Minimum Inventory**

Never before has inventory been reduced to the stocking of a few components to permit you to provide at all times *any* required type of service. It *can* be done with the new Kellogg 1000 Series Telephone.

★
★
★

*You'll be Wise to Work* WITH KELLOGG MASTERPHONES

## INSTALLATION AND SERVICING

**ersal Ringer Design**

mplete line of biased, harmonic straight line ringers is available both common battery and magservices. All ringers are similar sign, adjustment and mounting; parts are interchangeable.

**Single Base Plate**

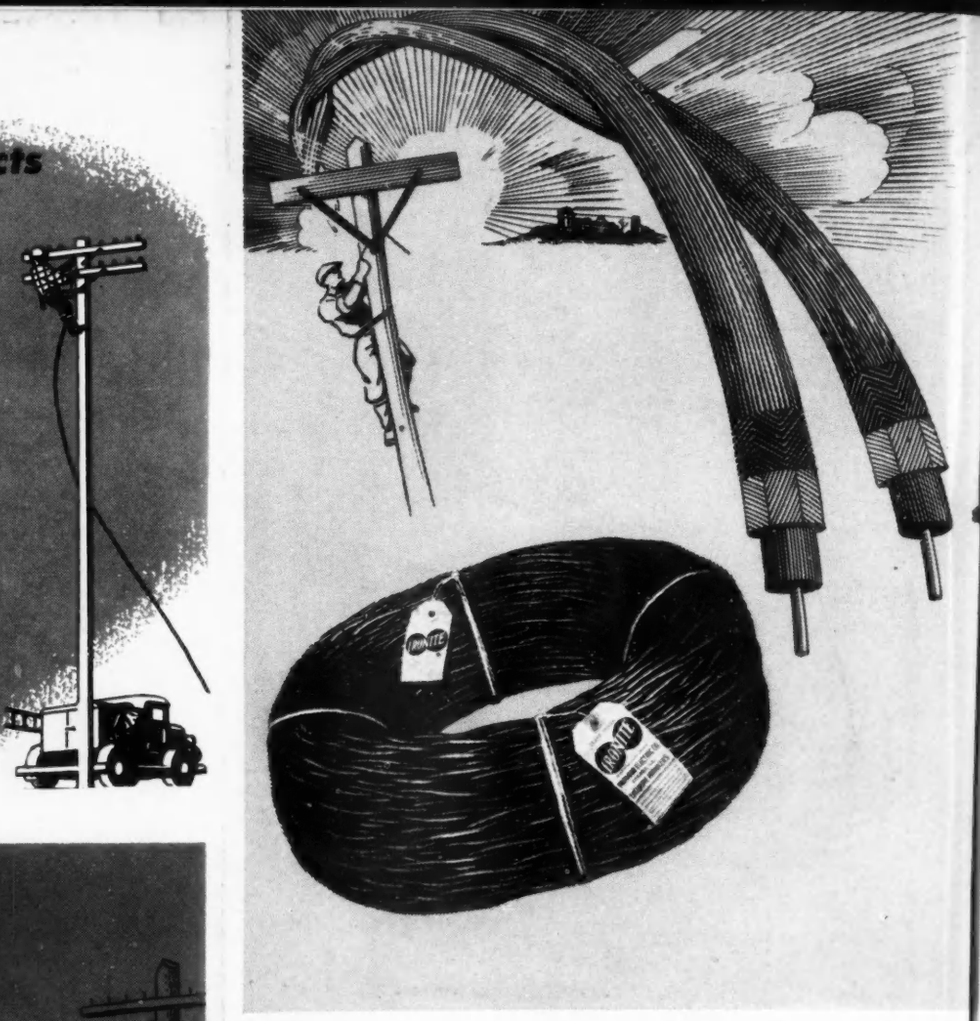
Both desk and wall telephones use the same base plate. All components are mounted on the base plate and are easily accessible. Housings are changed in a matter of seconds.

**Simple Adaptation**

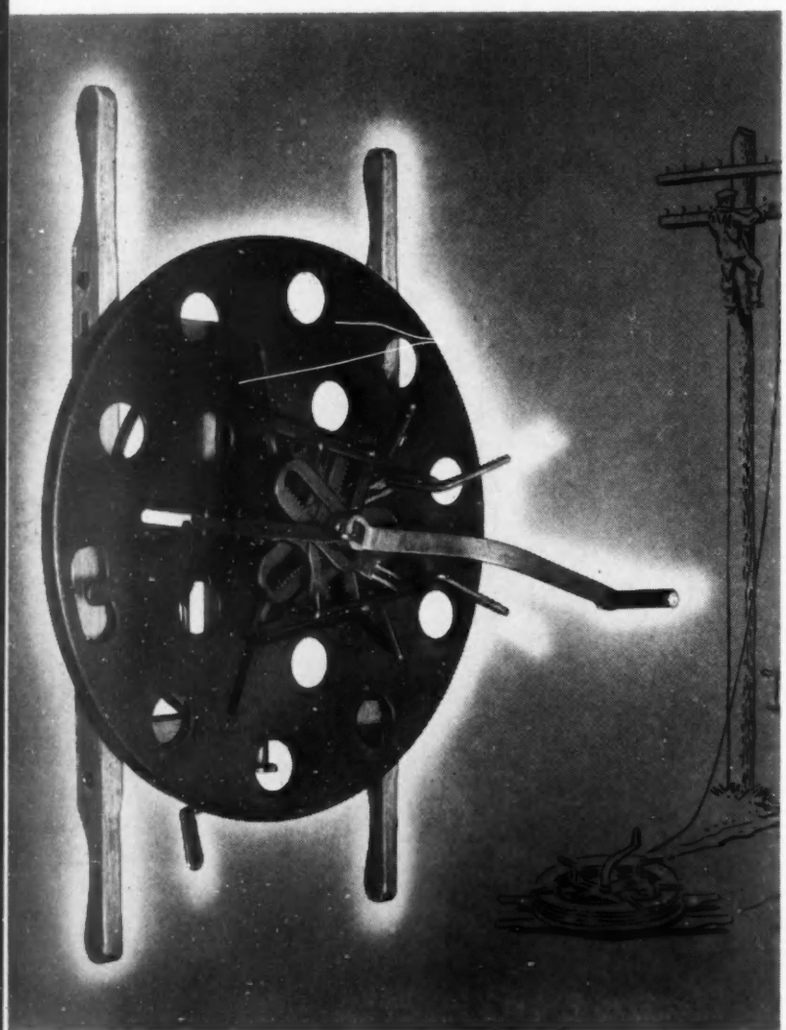
To remove the housing, to adapt circuit to metallic or grounded ringing, to zone induction coil, to change condenser capacity—all of these can be accomplished in a few moments using only a medium-sized screwdriver.

**The Satisfaction Lasts When You Buy Products**

# *Recommended and Guaranteed* by KELLOGG



**Back from the Wars.** Increased quantities of PARAGON ELECTRIC CO. Ironite Drop Wire are now available for domestic use. Proved by service to the industry for over 35 years, Ironite Drop Wire has exceptional strength to stand unusual strains with complete safety. It is an excellent conductor, economical, "armored" for extra weather protection.



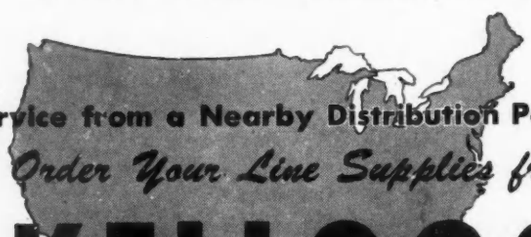
**Makes the Job Easier.** Paying out and taking up wire becomes a simple procedure when you use Matthews Adjustable Wire Reels. Made by W. N. MATTHEWS CORPORATION, they outlast ordinary reels and give you substantial savings on spool and shipping costs. They re-coil old wire perfectly, making its re-usability easier and convenient for your line crews.

There's three-way satisfaction when you concentrate purchases of line supply and construction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 50 strategically located distribution points.

**KELLOGG SWITCHBOARD & SUPPLY COMPANY**

Factory and General Offices: 6650 S. Cicero Avenue, Chicago 38

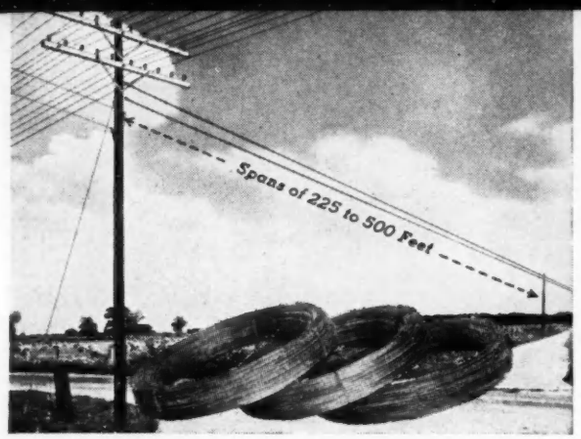
Branch Offices: Kansas City, San Francisco, St. Paul, Los Angeles



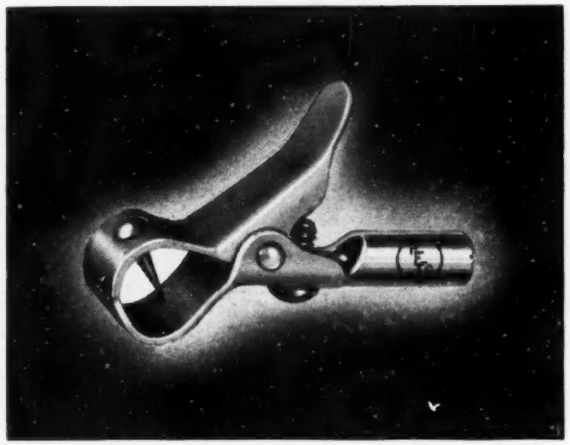
**For Service from a Nearby Distribution Point**

*Order Your Line Supplies from*

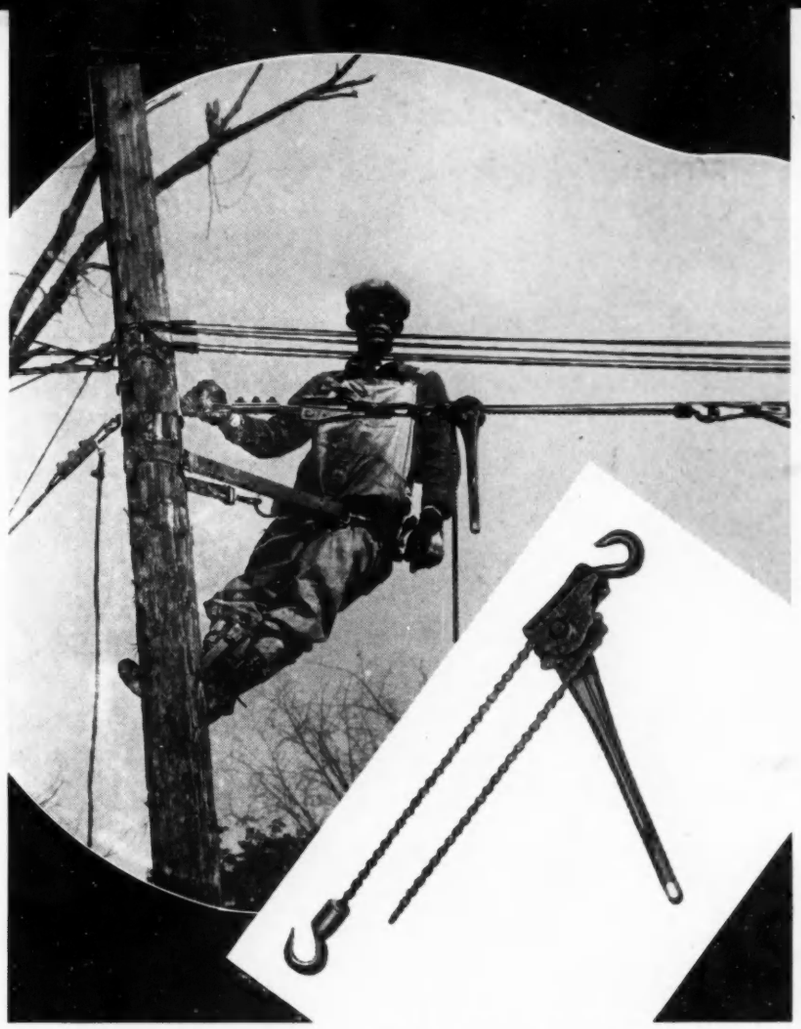
# KELLOGG



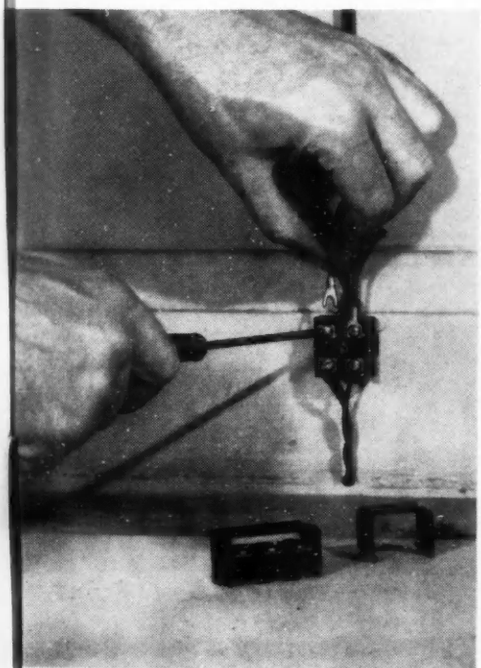

**Save Three Ways** . . . on materials, man-hours, and maintenance, with INDIANA STEEL & WIRE CO'S. Crapo HTL-85 and Crapo HTL-135 Line Wire. Galvanized by the famous Crapo Galvanizing Process, it's protected with a heavy, ductile, tightly-adherent coating of zinc.



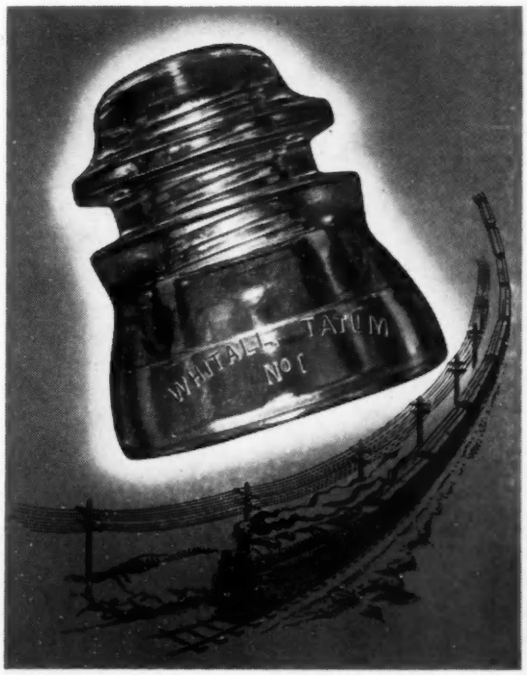
**You Can Rely** on Reliable Test Clips because they're designed for long, hard service. Made by RELIABLE ELECTRIC CO., they are fabricated with bronze, have hard, sharp insulation-puncturing points and perfectly registering teeth. Smaller size without point in flat nosed design also available.



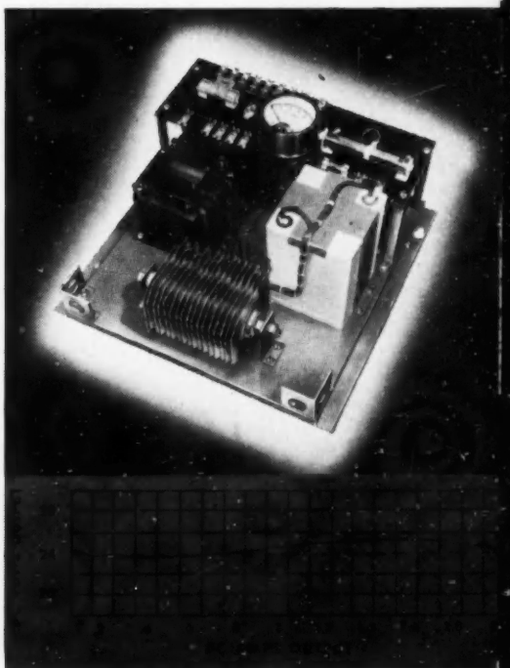
**Built-In Safety Features** are numerous in Coffing "Safety-Pull" Hoists. Dual ratchet and pawl assembly, independent of each other, prevent slippage or dropping of the load. Automatic stops prevent handle from spinning if hand should slip and the "safety-valve" handle will bend before chain will break or hooks straighten out. Standard equipment with most companies. Made by the COFFING HOIST CO.



**Has All the Answers!** Kellogg Connector Blocks have every feature needed to save installation time and assure foolproof connections. U-shaped gripper plates take spade or spike tips on any size wire. Block is shaped to hold tips in place without lateral movement. In 2 and 3-point sizes.



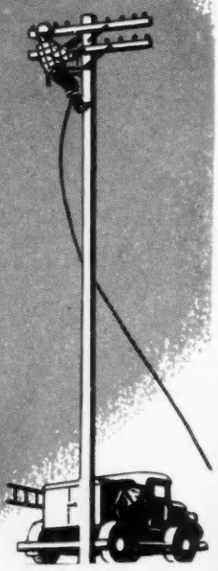

**Meet Every Service Need.** That's why so many telephone companies are using Armstrong's Whitall Tatum Insulators, made by ARMSTRONG CORK. CO. Some of their outstanding features are crystal clarity of glass, accurate gauging, resistance to variations in temperature. A good bet for lower maintenance costs.



**Steady DC Voltage,** required by switchboard lamps and telephones (especially dial), can always be assured when you use a RectiFilteR. Made by RAYTHEON MANUFACTURING COMPANY, it operates from regular AC source. And with no moving parts to wear, maintenance is low.

**The Satisfaction Lasts When You Buy Products**

# *Recommended and Guaranteed* by KELLOGG



**Fits Telephone Needs to a "T".** Because Ray-O-Vac Telephone Dry Batteries are built to resist deterioration when not in use, they are especially serviceable for telephone work. An internal protective coating, developed by RAY-O-VAC CO., extends the useful life of batteries whether they are used or not. Result: fewer replacements, fewer batteries purchased, and lower costs.

**Easy Cutting Qualities** and expert workmanship are combined in the No. 777 Two Hand Pruner, made by BARTLETT MANUFACTURING CO. This tool is designed to make pruning an easier, faster, more thorough job. Both blade and hook are made of hardened drop forged crucible tool steel for durability and leave clean cuts without injuring the bark.

There's three-way satisfaction when you concentrate purchases of line supply and construction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 50 strategically located distribution points.

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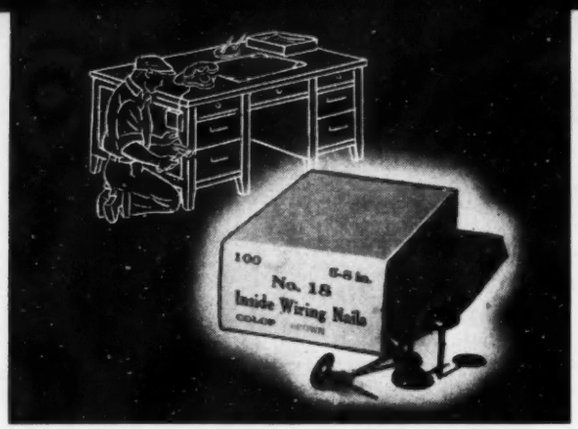
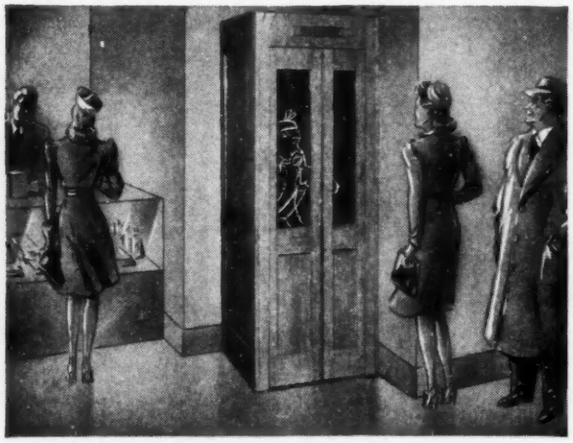
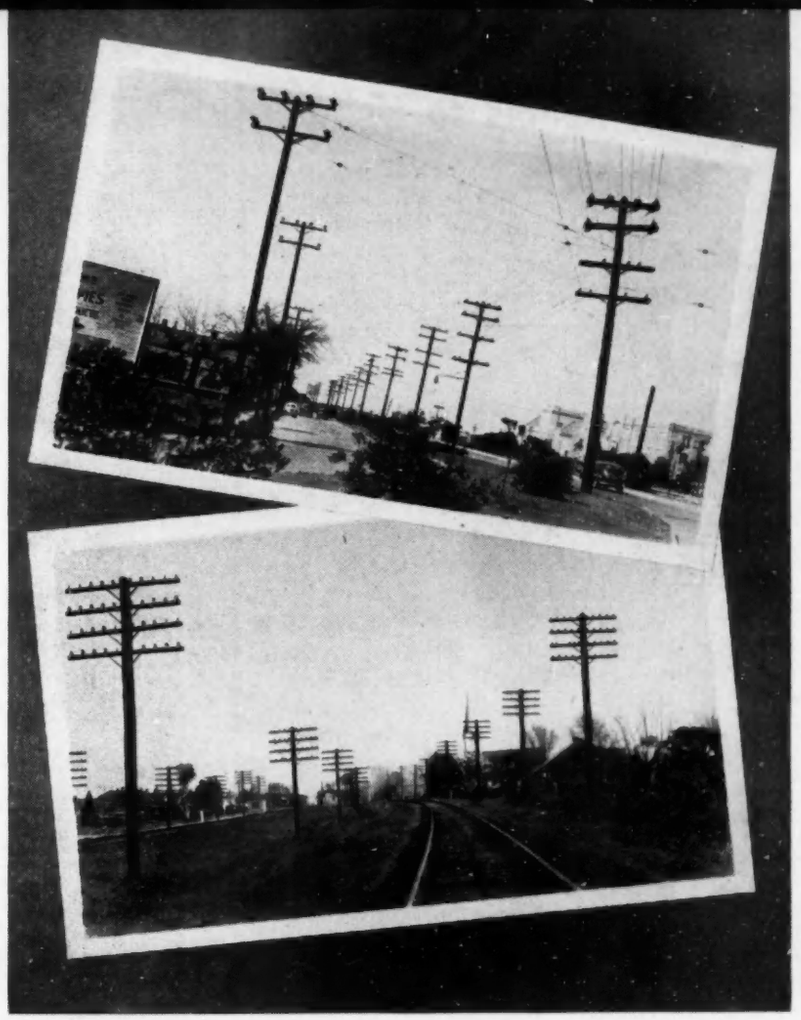


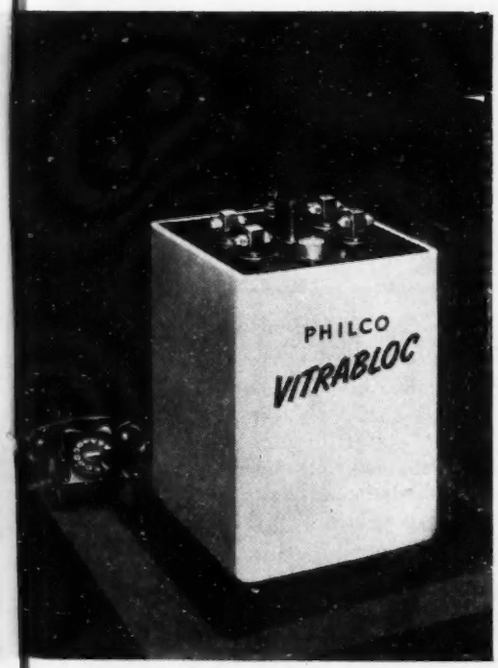

**It's a Snap** to make neat installations with Rhodes Telephone Wiring Nails, according to telephone men who use them exclusively. M. M. RHODES & SONS maintain the uniform high quality of these nails by putting them through rigid driving, withdrawing, bending and immersion tests.



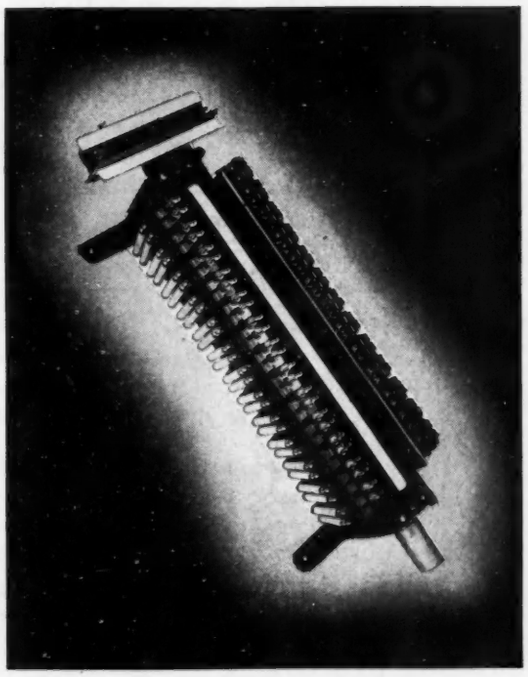
**Increased Pay Station Revenue** is easily accomplished when you give the public the privacy, roominess and comfort of CHURCHILL CABINET COMPANY'S Booths. Of the many styles available, the No. 100 Booth with acoustical designing, automatic light and ventilator, is very popular.



**Long Life Expectancy** is built into pressure-treated Southern Pine Poles and Crossarms. Carefully and thoroughly treated by the AMERICAN CREOSOTE WORKS, INC., these poles have the extra durability required for dependable service under the toughest climatic conditions. For poles that measure up to the highest standards of strength and long life, always specify "Pressure-Treated Southern Pine."




**Doubles Battery Room Capacity!** In capacity, dimensions and engineering features, the PHILCO Vitrabloc Storage Battery gives telephone engineers all the advantages of the rubber-jar cell, in many cases actually *doubling* the ampere hour capacity of rooms designed for glass jar batteries.



**Moisture-proof, Compact, Convenient.** The Cook Type "T" Main Distributing Frame permits direct termination of paper wrapped cable, and eliminates the old practice of splicing silk and cotton covered tips. All jumpers are at front of frame for easy installation and tracing. Made by COOK ELECTRIC COMPANY.

**On Guard—in Any Weather!** Hemingray Insulators stay on the job through rain, snow and summer heat. Made by OWENS-ILLINOIS GLASS CO., these *weather-proof* insulators are checked regularly under rigid specifications in the laboratory. Thus every shipment is always uniform.

## "It Seems to Us"

**Tommy Thompson, telephone sales manager of Stromberg-Carlson, has a hobby of hunting — just any kind, he says. In addition to his regular duties he is now on a hunt for white shirts and he is dead serious, too! Size 15½, sleeve 33, if you want to make him happy.**

•

Fred Pfaender, president of the New Ulm, Minn. telephone company, at the age of 82 is still active and having lots of fun. His main hobby besides the company is his job as secretary of the Minnesota State Fireman's Assn. In his time he has served the telephone industry long and well.

•

**Some of our executives in the telephone industry manage to be versatile authors as well. Lee McCanne, v. p. and gen. mgr., and Charlie Pritchard, credit mgr., both Stromberg-Carlson officials, are contributing authors to Prentice-Hall's new volume "Essentials of Selling," which makes all of us mighty proud.**

•

Charley Boutin of the Southwest Missouri Telephone Co. is very proud of the training school for returning GIs which he started October 1, 1945. This plan is a good one for any fair sized telephone company to investigate as the government finances living expenses of service men while they learn the trade.

•

**Flowers go to Jack Crowley, secretary of the Minnesota Telephone Association, for the worthwhile conventions he stages. There is never a dull moment nor a wasted one in his programs. His meeting in January was the best we have attended.**

•

Gordon J. Berry, vice pres. of Electric Products, Cleveland, O., was recently honored by election to the presidency of the Electric Truck Association.


# TELEPHONE ENGINEER AND MANAGEMENT

**Vol. 50. No. 2** **FEBRUARY, 1946**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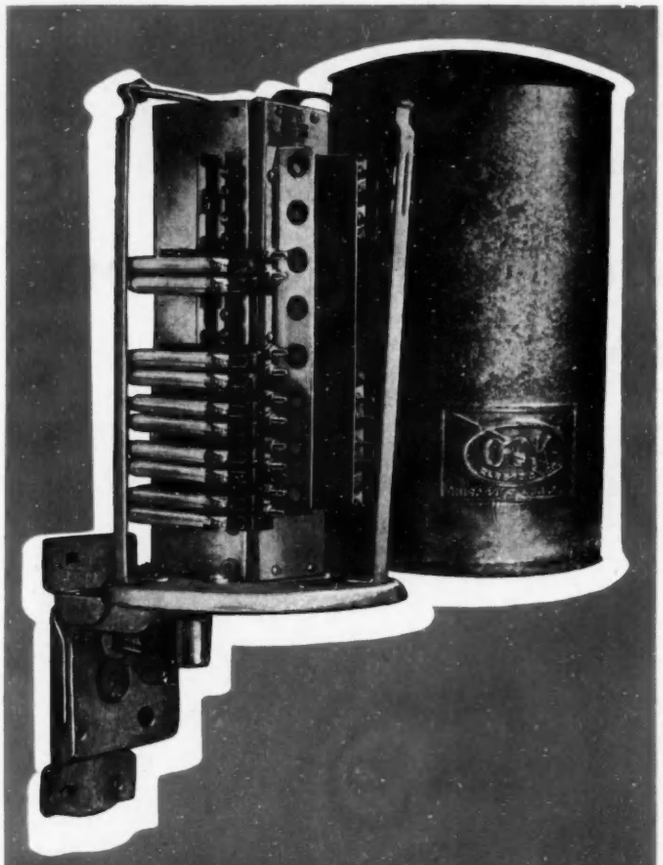
**SERVING THE SIX BILLION DOLLAR TELEPHONE INDUSTRY**

***Founded in 1909***

Office of Publication, Pontiac, Illinois. Executive and Editorial Offices 7720 Sheridan Road, Chicago 26 Illinois. Phone Rogers Park 3040. RAY W. SMITH, Editor: ROY F. SMITH, Adv. Manager, DON C. SORENSEN, Sales Prom. Mgr. Subscriptions: U. S., Cuba, Mexico $1.50 Per Year; Canada, $2.00; In all Other Countries, $3.50. Single copies, U.S.A., 15 cents. Single copy JANUARY 15 BLUE BOOK BUYER's GUIDE $1.00. All subscriptions should be sent DIRECT to 7720 Sheridan Rd. Chicago 26, Illinois.



# S-20

**THE POLE CABLE TERMINAL FEATURING THE MAXIMUM IN**

- **ECONOMY**
- **CONVENIENCE**
- **ACCESSIBILITY**

**IN INSTALLATION, SERVICING AND MAINTENANCE**

The Type S-20 Pole Cable Terminal and Protector Mounting is in wide use as a combined protected and unprotected all steel cable terminal. As part of the Trans-Mount System, the S-20 offers maximum economy because Type H Protector Mounts may be installed as required.

The self-soldering nozzle of the S-20 is located close to the pole to bring the cable behind the subscribers' drops. The mounting base is open at the back adjacent to the pole to prevent accumulations of ice, dirt or moisture. A separate mounting bracket shaped to fit the pole provides easy installation without gaining the pole. Drop wires enter the terminal through individual insulating knockout holes.

Every possible feature of convenience and accessibility for installation, servicing and maintenance has been carefully engineered in designing the S-20. All connections are at the front, the self-soldering nozzle lies close to the pole, a strong guide holds the hood securely in raised position for working ease, and drops are taken out through knockout in an insulating plate to prevent the entrance of birds, insects, dust, etc.

## The TRANS-MOUNT SYSTEM

The S-20 Pole Cable Terminal is part of the Cook Trans-Mount System of Protection and Distribution. The Trans-Mount System is composed of the Type S-20 Pole Cable Terminal, the Type R Sub-Station Protector, the Type T Main Distributing Frame, the Type U Utility Sub-Station Protector, the Type UA-20 Aerial to Underground Terminal and the Type IT-20 and Type TN-20 Interior Cable Terminal Vaults, all using the Type H Protector Unit.

2700 SOUTHPORT AVENUE
CHICAGO 14, ILL.

COOK ELECTRIC Company

Telephone Protection & Distribution Engineering Since 1897

# EXECUTIVES!

## TELECOMMUNICATION ECONOMY WITH EFFICIENCY

The evergrowing demand for telecommunication facilities over increasingly greater distances has created the need for a more economic line transmission system without the sacrifice of efficiency.

Appreciating the universal advantages to be gained the highly-trained technical staffs of Automatic Telephone & Electric Co., Ltd. and Telephone Manufacturing Co. Ltd., have collaborated in the development of multi-channel line transmission systems.

These provide facilities for several simultaneous, independent and secret conversations over each pair of wires in a cable or overhead line network. Additional transmission channels can thus be provided as required and a greater volume of telephone or telegraph traffic handled without installation of expensive additional cable or open-wire circuits.

Our Technicians will gladly assist with detailed information on—

**ATE/TMC** **TELECOMMUNICATIONS TRANSMISSION EQUIPMENT**

MANUFACTURERS

*Please address enquiries to:—*

**AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.**
STROWGER WORKS, LIVERPOOL
ENGLAND

**TELEPHONE MANUFACTURING CO. LTD.**
WEST DULWICH, LONDON, S.E.21
AND ST. MARY CRAY, KENT, ENGLAND

A802-A6

# Highway Reel and Pole Trailers

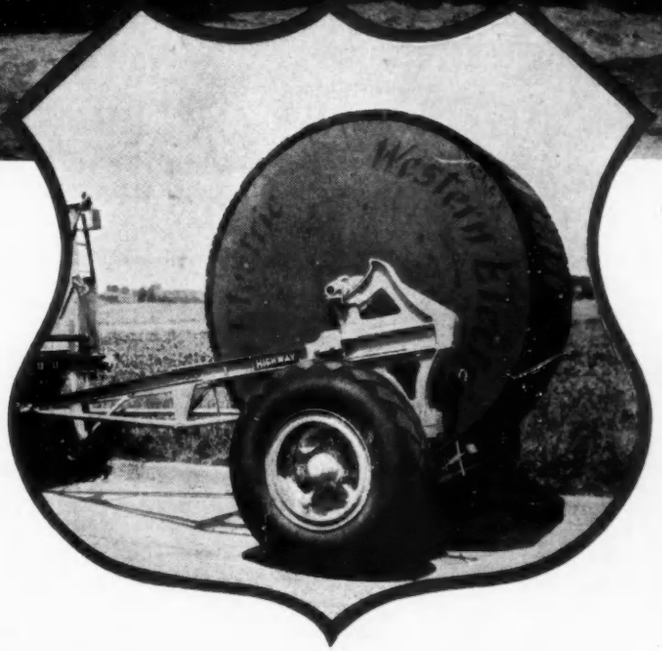
## *save time, cut costs*

TRANSPORTING cable reels and poles is reduced to a safe, simple, easy operation by specially designed Highway Trailers. Heavy, unwieldy cable reels are quickly loaded by tipping back the Highway Cable Reel Trailer until saddles engage the reel spindle, then pulling tongue down and coupling it to the truck. Highway Pole Trailers are coupled to any line construction truck, doing away with the old special-truck-and-bolster nuisance.

These and other Highway equipment are the logical outgrowth of over a quarter-century's experience in successful trailer engineering. For years Highway trailer engineers have enjoyed the closest cooperation with leading engineers in the fields of communications and public utilities. By knowing your problems, thoroughly, Highway has been able to work out the right answers.

Before you buy new equipment, learn about Highway Line Construction and Maintenance Bodies, Utility Bodies, Earth Boring Machines, Winches, Power Take-offs, and Derricks.

*Highway Pole Trailers and Cable Reel Trailers are saving time and money for many of the leading companies in the field from coast to coast.*

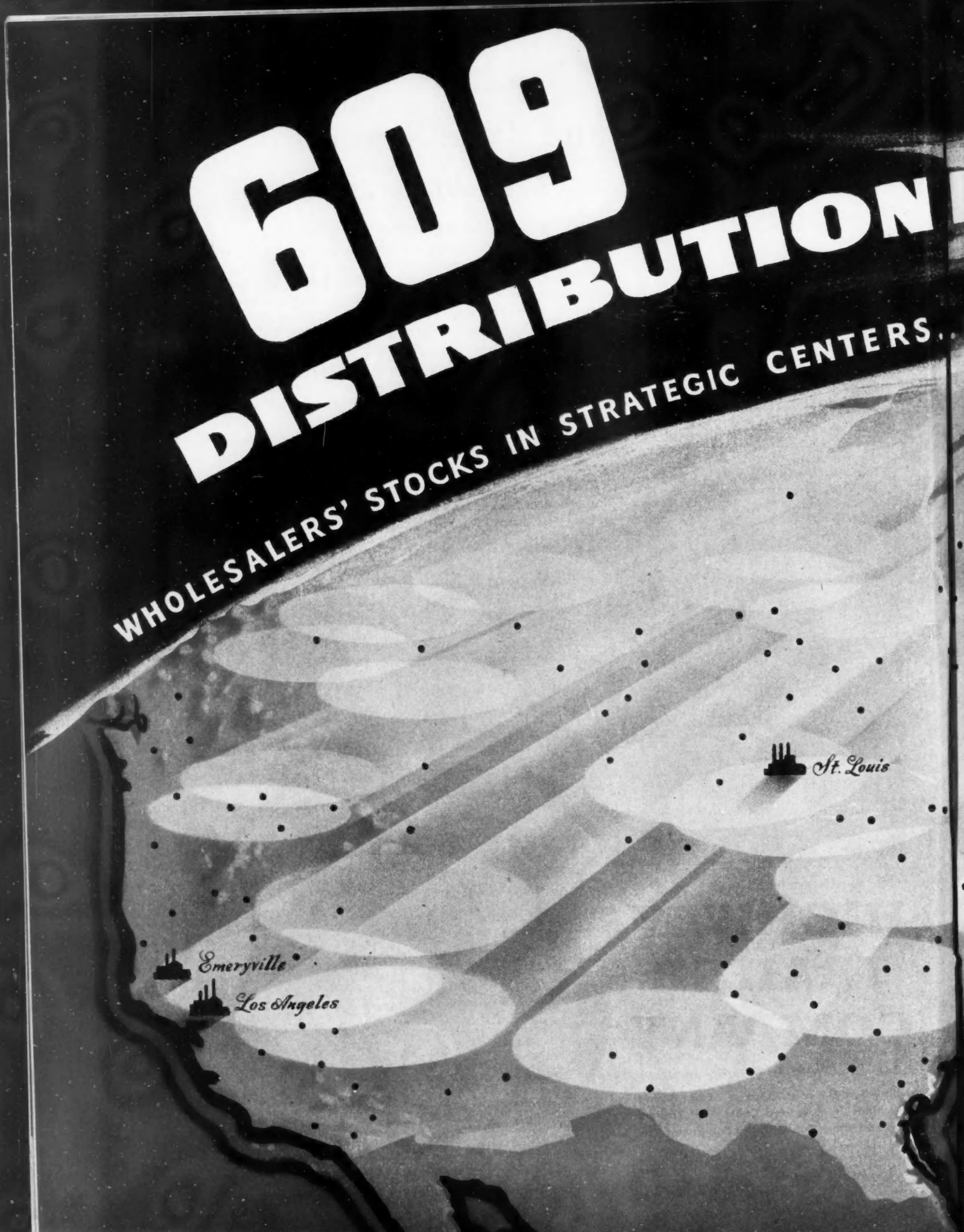



# HIGHWAY TRAILER COMPANY

*Manufacturers of*

**Utility Bodies • Winches • Earth Boring Machines • Pole and Cable Reel Trailers and Other Public Utility Equipment**

EDGERTON, WISCONSIN, U. S. A.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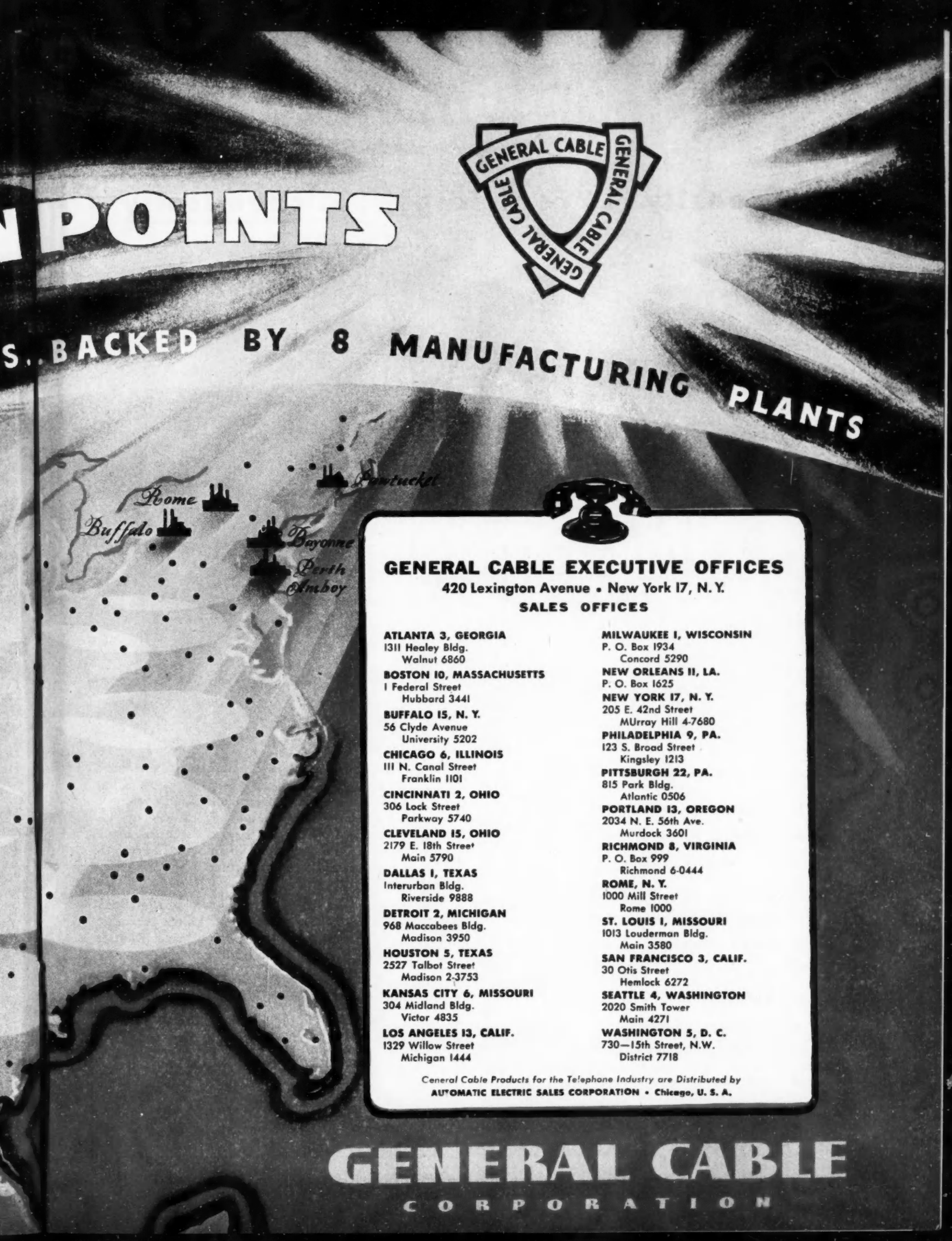


## GENERAL CABLE EXECUTIVE OFFICES

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CORPORATION

# Now-kill weeds!

**easily . . . completely . . . chemically**

# 2-4 DOW WEED KILLER

***Check Your Weed Problem***

- ✓ **Barnyard, fence rows, ditch-banks**
- ✓ **Highways, railroads, utility lines**
- ✓ **Parks and playgrounds**
- ✓ **Fields, orchards, cut-over land**
- ✓ **Irrigation, drainage ditches, canals**
- ✓ **Estates, lawns, golf courses**
- ✓ **Airports, landing strips**
- ✓ **Pasture and ranch land**
- ✓ **Cemeteries**
- ✓ **Vacant lots, roadsides**

***See your dealer or write direct***

AGRICULTURAL CHEMICAL DIVISION

**THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN**

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago
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Kill weeds the modern chemical way you have been reading about! Spray 2-4 Dow Weed Killer —to kill weeds easily, completely! 2-4 Dow Weed Killer is more efficient, easier to handle. It kills deep roots—does not sterilize soil or harm grass when used as directed. It's economical. Powder: 4 ounces up to 50-pound drums. Liquid: ½ pint up to 50 gallons.

This is the first of a series of weed killers produced by Dow. Selective weed killers for other specific purposes will soon be available. Keep in touch with Dow and you'll kill more weeds!

DOW

**CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE**

THIS *Nicopress* SLEEVE

plus

THIS *Nicopress* 17-2 TOOL

**Make better pair splices faster than you've ever made them before!**

*The National Telephone Supply Company*

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

*Canadian Mfr.* — N. SLATER CO., LTD., HAMILTON, ONT., CANADA

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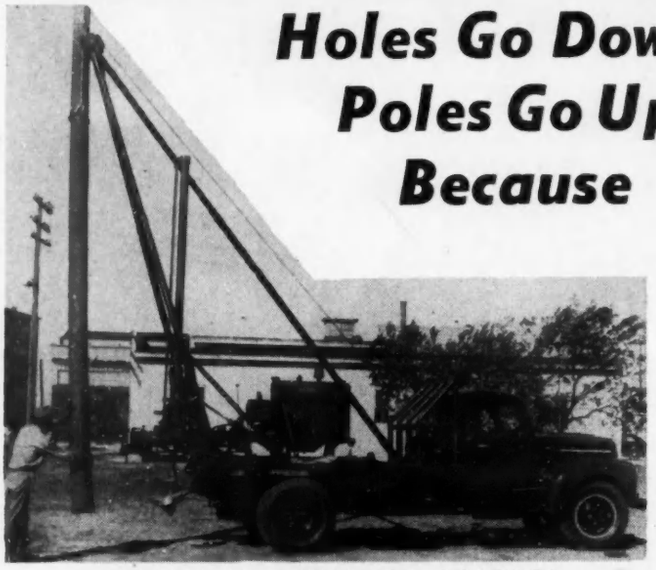
# JAQUES
## HYDRAULIC EARTH BORING MACHINE

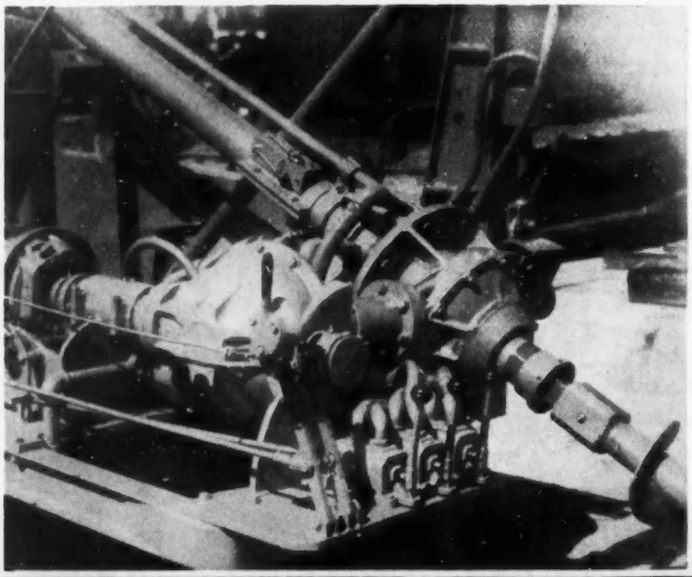


## *Holes Go Down Quicker, Poles Go Up Faster With a Jaques Because*

1. All plumbing is hydraulic controlled, enabling faster transportation from hole to hole as machine can be instantly lowered to traveling postion.
2. Faster drilling, as the hydraulic feed maintains a constant pressure on the bit—the texture of soil controls the rate of digging.
3. Hydraulic pressure on bit transmits less shock to machine while digging in rock.
4. Operator fatigue reduced to a minimum.
5. Anchor holes are easily drilled at any angle.

**HYDRAULIC FINGER TIP CONTROL**

Reduces operator fatigue. One man easily operates this machine as all controls are conveniently located. Peak operating speeds easily mantained hour after hour with this simple, trouble-free hydraulic control.



### SPECIFICATIONS

**Motor**—Int. Model U4—with electric starter. **Construction**—Unit mounted on steel-I-beam skids (easily attached to or removed from truck). **Drive**—Mechanical—four forward speeds and one reverse. **Feed**—Hydraulic. **Lift**—Hydraulic. **Leveling**—Hydraulic. **Hole Size**—Up to and including 24 inches (larger diameter on special order). **Depth of Hole**—8 to 9 feet with standard machine (greater depth on special order). **Weight**—3400 pounds. **Width**—4 feet, 3 inches; **Length**—10 feet.

***Immediate Delivery on Standard Models***

***for Further Information Write or Wire***

# JAQUES POWER SAW CO.
DENISON, TEXAS

# 32 YEARS AGO THIS MONTH

## *the long stone needles were threaded underground*

It was on February 26, 1914, on the eve of World War I, when the first underground cable between Boston and Washington was placed in commercial service. Measured by later engineering achievements, this hook-up between the two cities of the "needle" monuments may not seem especially significant. But it was . . . and is.

It is significant because this 455-mile line was a starting point for even greater expansion . . . sweeping on to Chicago . . . on to San Francisco . . . and the end is not in sight. Telephone progress never stops. It picks up speed as the years roll by . . . in keeping with its tradition of better service, greater efficiency . . . and with faithfulness and dependability.

In Exide Batteries you will find the same dependability for which telephone service is famous throughout the world. Since 1895, nearly 20 years before the Boston-Washington cable, Exides have been proving themselves worthy of that trust.

**Exide**
**TELEPHONE BATTERIES**

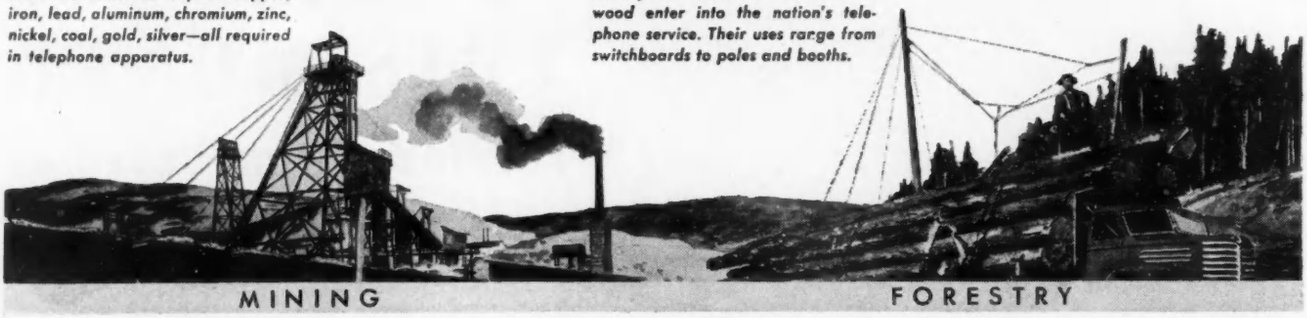
THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

# OUR BIG JOB FOR THE BELL SYSTEM

*From far off places must come many materials needed to make your telephone—including flax, mica, asphalt, tungsten, antimony, cobalt, tin, platinum.*

*Farms of this country must supply essential products and by-products —such as cotton, wool and leather.*

IMPORTING FARMING



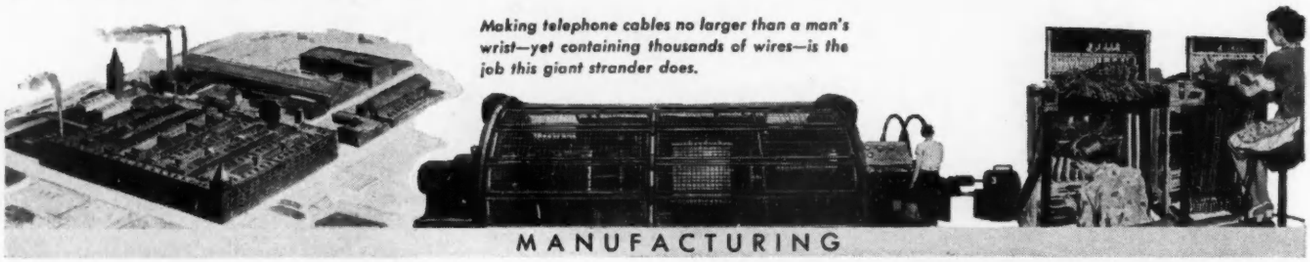
*Then the mines must yield copper, iron, lead, aluminum, chromium, zinc, nickel, coal, gold, silver—all required in telephone apparatus.*

*Twenty-five domestic varieties of wood enter into the nation's telephone service. Their uses range from switchboards to poles and booths.*

MINING FORESTRY

*Raw materials must be brought together in Western Electric plants, where skilled workers and marvelous machines turn them into vast quantities of complex apparatus.*

*Wiring an intricate switchboard—through which your voice will go—calls for skilled hands. Remember that switchboards and cable are just two of thousands of items you use when you telephone.*

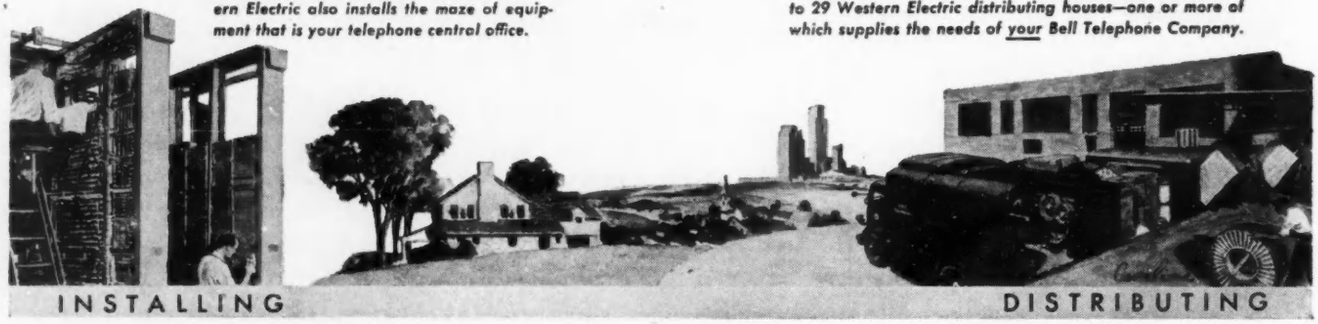


*Making telephone cables no larger than a man's wrist—yet containing thousands of wires—is the job this giant strander does.*

MANUFACTURING

*In addition to making the apparatus, Western Electric also installs the maze of equipment that is your telephone central office.*

*Telephones, wire, cable and countless other products go out to 29 Western Electric distributing houses—one or more of which supplies the needs of your Bell Telephone Company.*



INSTALLING DISTRIBUTING

As supply unit of the Bell Telephone System, Western Electric has one of industry's most complex jobs.

Today we are working full speed ahead on equipment not only to meet immediate telephone needs, but also to carry out the Bell System's $2,000,000,000 post-war construction program.

This vast program promises a record in peacetime production at Western Electric—with a level of employment higher than in the years just before the war—and better-than-ever telephone service for you.

**Western Electric**

**MANUFACTURER**
**PURCHASER**
**DISTRIBUTOR**
**INSTALLER** *of Central Office Equipment*
**FOR THE BELL TELEPHONE SYSTEM**

*Buy Victory Bonds —and keep them!*

**MAINTAINS CLOSE**

# VOLTAGE

**LIMITS**

**REQUIRED**
**for**
## DIAL PHONES
***. . . and does it Automatically!***

# *Raytheon Rectichargers*

AND THAT, of course, is only *one* of the benefits to be gained. The Raytheon Rectichargers, with a *small* storage battery floated across its terminals, provides a closely stabilized DC output . . . lengthens battery life . . . permits use of smaller batteries . . . improves operation and efficiency of manual and automatic communication systems.

Few inspections are needed. Vernier control of output voltage is provided. Battery activity is cut to the minimum, since the Rectichargers carries the normal current demand.

Send today for Bulletin DL 48-263B, describing and graphing the many operating advantages of this proven and dependable instrument.

**RAYTHEON**

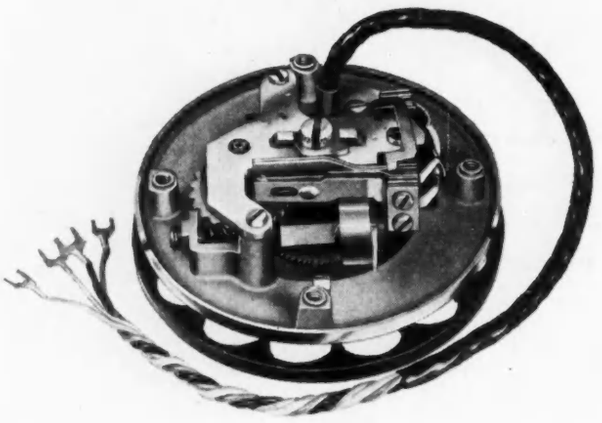
**RAYTHEON MANUFACTURING COMPANY**
*Electrical Equipment Division, Waltham 54, Mass.*

*Excellence in Electronics*

# Smooth as

## The New STROMBERG

Dial mechanism is housed within a transparent plastic cover which being practically dust-tight affords protection to all working parts.



In the operation of this new Dial, the preparation or wind-up operation produces movement in the main and secondary shafts only. The remaining parts move only when impulsing.

**STROMBERG-CARLSON** Factory, General Offices: Rochester 3, N.Y.

Branch Offices: Chicago 6, Kansas City 8, San Francisco 3

In Canada: Stromberg-Carlson Company Limited, Toronto

*TELEPHONES, SWITCHBOARDS AND INTERCOMMUNICATION SYSTEMS • SOUND EQUIPME*

*as Velvet!*

The face of the new Stromberg-Carlson Dial is made of fire-proof plastic. Durability has been considered, too, in the design of the label panel.

# CARLSON DIAL

**SMOOTHNESS** is a predominating feature in the operation of the new Stromberg-Carlson Dial. Subscribers are impressed quickly with the ease of rotation of the finger plate which is made of durable plastic with a permanent finish that will neither wear off nor mar.

**SMOOTHNESS** is insured further by the fact that the dial mechanism is mounted on a rigid aluminum die-cast housing which insures permanent alignment for all parts, and that rotating parts are either precision machined or molded for easy and quiet operation.

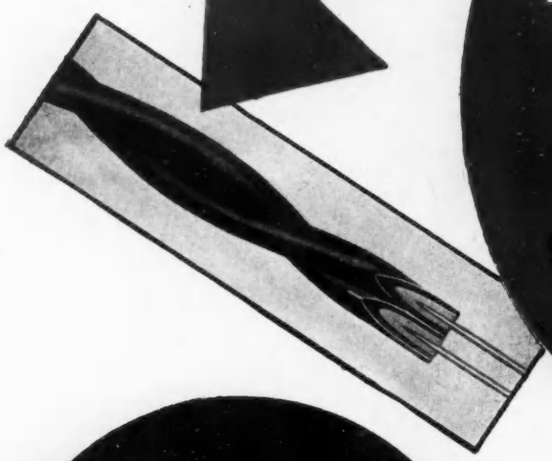
The new Stromberg-Carlson Dial will not only fit Stromberg-Carlson Dial Telephones but those of other manufacturers.

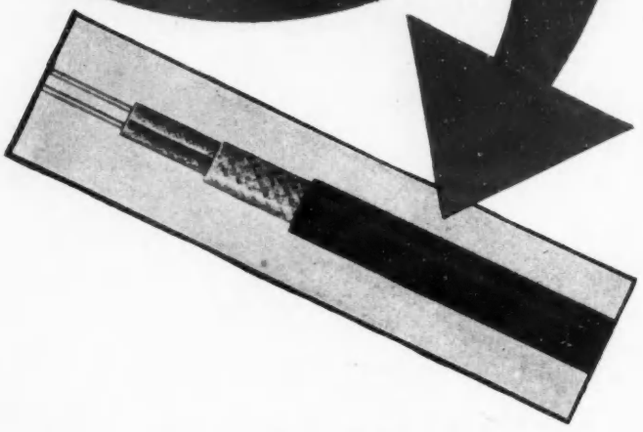
STROMBERG Telephone CARLSON

*SOUND EQUIPMENT AND INDUSTRIAL SYSTEMS • RADIOS, RADIO-PHONOGRAPHS AND TELEVISION*

# NEOPRENE SHEATH

gives greater protection from weathering and abrasion





## A *NEW* DEVELOPMENT IN TELEPHONE DROP WIRE

IT WASN'T EASY to improve the service life of telephone drop wires, because the standard drop wire is good—good enough to make American telephone service the best in the world. But the proven abrasion- and weather-resistance of neoprene has made a major improvement possible.

So today you'll find neoprene sheaths on this most modern telephone wire. The neoprene sheath on this new type is highly resistant to abrasion and wear, to weathering and sunlight, to compression cuts, to heat and flames, and to acid fumes and smoke in industrial areas. The neoprene jacket also furnishes additional insulation.

Specify neoprene sheaths for better wire and cable wherever you need a product that lasts longer under tough conditions.

For latest technical information on neoprene, and for new and interesting stories on how neoprene serves industry, read "The Neoprene Notebook." Write us for your free subscription.

**E. I. du Pont de Nemours & Company (Inc.)**
**Rubber Chemicals Division, Wilmington 98, Delaware**

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

FOR HIGHEST QUALITY WIRE AND CABLE SPECIFY

**DU PONT NEOPRENE**
The Versatile Synthetic Rubber

# EDITORIAL

## *Small Company Simplified Regulation*

WE are intrgued by the idea, discussed in the Observation Tower in this issue, that the regulation of small telephone companies should be basically simplified.

So far as we know it is true that, as is stated in that discussion, the telephone industry is the only permanently regulated industry in this country that has so large a number of small individual units, all of which must be dealt with, in regulatory matters, under the same fundamentals that apply to very large units of the industry.

Of the some 6,300 Independent telephone companies in the United States, some 4,700 companies have, according to the latest available data, fewer than 250 company-owned telephones. Most of these small companies are locally-owned, of course; some of them with a total of fewer than 250 company-owned stations have more than one exchange.

Many of these companies have fewer than 150 company-owned stations; a considerable number of them have fewer than 100 telephones, and there are actually quite a number of them with fewer than 50 company-owned telephones.

These small telephone companies are in many ways—and, it could be said, in character—a different kind of business than the large telephone company operating many thousands or even millions of telephones.

Yet, the laws creating regulatory commissions make no basic differentiation between the very large and the very small telephone company so far as the fundamentals of regulation are concerned. The smallest telephone company is, under the law, subject to the same basic theories, rules and procedures of commission regulation as the largest company.

As an illustration, if a commission decided that it will hereafter establish the rate base on the basis of original cost, the very smallest company must, in order to ascertain its own rate base for rate-fixing or other purposes, ascertain the original cost of its plant. The cost of this ascertainment would likely be all out of proportion to its real value to the commission or the little company, so far as dealing with the little company's rates is concerned—but legally the rule, made primarily to apply to large companies, must also apply to the little company as well.

The commissions know all this, of course, and in general try to and do simplify small company regulation, rate cases, etc., as much as they can *under the law*. But, legally, under present regulatory laws, the same basic principles of regulation apply to the smallest company as to the largest.

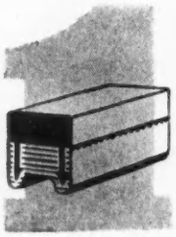
The classification of telephone companies according to their average annual revenues does not change this situation, since such classifications apply principally to the things to be done to keep accounts. From that standpoint the requirements upon the small company are simplified—but, as to the basic features of regulation, the small company is subject to the same law as the large company.

Under fairly recent U. S. Supreme Court decisions, the commissions have considerable latitude as to the methods they use to determine utility rates—so long as the result the commissions reach is fair and reasonable. But even this latitude does not seem to give a commission the right to deal with a large company one way, and with a small company another way—that is, to apply one set of principles of regulation to a big company and another to the small.

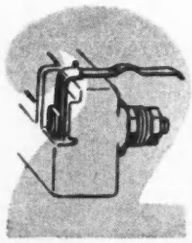
We do not maintain that the little telephone company should be entirely free of regulation. But perhaps there is a way by which the regulatory principles applying to it could be made more in keeping with the necessities, status and situation of a little business.

# Reliable *because...*

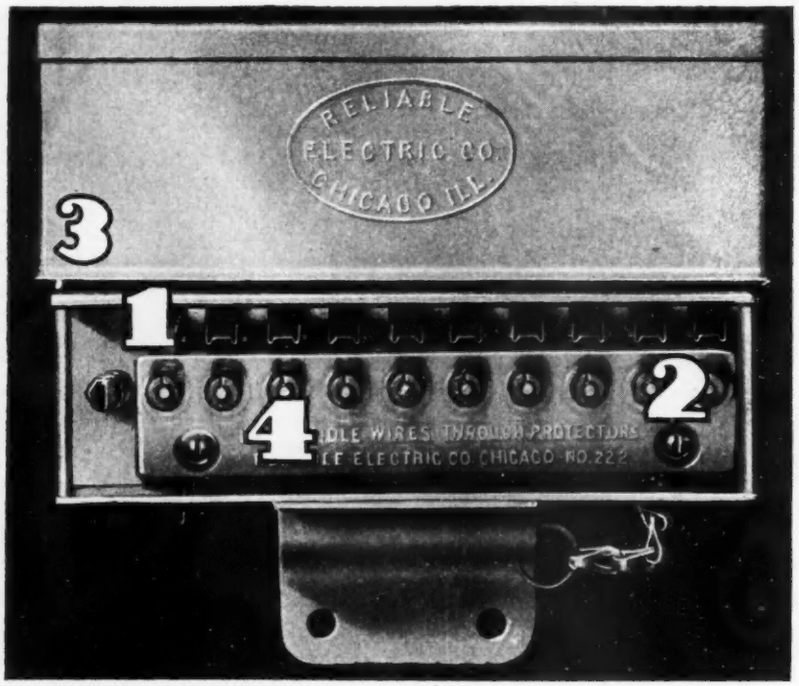
**—each individual part of the Reliable No. 222 Crossarm Arrester has been engineered and tested to more than meet all field requirements. It is rugged, easy to install and thoroughly dependable in performing its function. Build for the future—specify Reliable.**



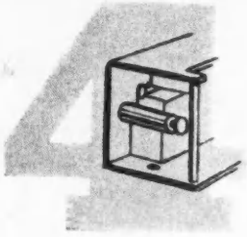
**Reliable Self-cleaning Sawtooth Discharge Blocks are standard equipment, dissipating static without time lag or grounding of the line. Dirty carbon troubles are eliminated.**



**Binding posts are treated to prevent both season cracking and the deposit of copper salts which cause surface leakage. Heavy phosphor bronze clips and springs are used.**



**Sliding zinc cover is weather-proof and rust-proof. Arrester frame is made of heavy sheet steel —hot galvanized.**



**Special low absorption porcelain insulates the binding posts. A unique ground post is solidly riveted to metal frame.**

## RELIABLE ELECTRIC COMPANY

3145 Carroll Avenue, Chicago 12, Illinois

**OVER 35 YEARS SERVICE TO THE TELEPHONE INDUSTRY**

# News Briefs...

## $80,000,000 Construction

Plans for a plant construction program involving an estimated expenditure of $80,000,000 in 1946 and of $350,000,000 in the five years through 1950 are now announced by the New York Telephone Company.

The program calls for plant expansion, replacements, betterments and service improvements throughout the company's territory in New York City and State and the adjacent section of Connecticut.

"Activities are already well under way on some features of the program," Carl Whitmore, president, stated, "but its full development depends upon basic essentials."

## File Rate Increase

The City and Farmers Telephone Company of Rushford, Minnesota, filed application with the Minnesota Railroad and Warehouse Commission for authority to increase its rates. The hearing is set for February 25.

## Buys Farm Lines

The West Iowa Telephone Company, with headquarters at Remsen, Iowa, has purchased the farm lines of the Turkey Valley Telephone Company, and will take over completely March 1. The Turkey Valley company has been dissolved. W. H. Daubendiek, secretary-treasurer of the West Iowa company, reports that a rebuilding program on these lines will soon be under way.

## Expects Mobile Service To Be Widely Used

The FCC expects mobile service to become one of the most widely used radio services. Indicated growth of the new mobile service, both urban and highway, to 11,000 stations by July, 1947 is based on frequency requests by telephone, bus, truck, taxicab companies, etc. It was specified the service would be divided into urban mobile and highway mobile services. The FCC used the general mobile plans of American Telephone & Telegraph and Bell System as an example in citing the possibilities of the service to the House Subcommittee.

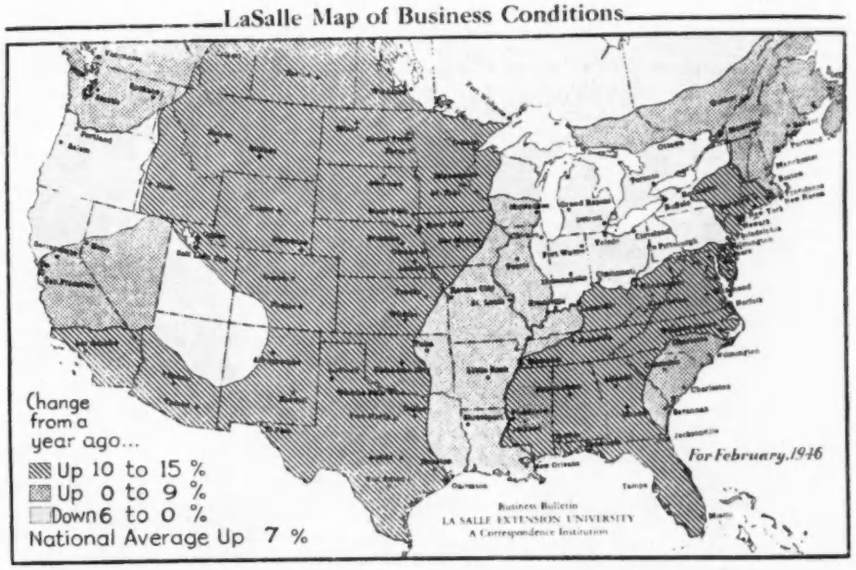
A.T.&T. estimated that in New York City alone, there were 15,000 doctors' cars, 500 ambulances, 20,000 buses and taxicabs and 10,000 commercial vehicles of which at least 10,000 could be expected to be equipped with radio in the next five or ten years.

In differentiating the FCC said the highway mobile service will be used by buses and trucks engaged in intercity transportation over long distances. It was added that following experiments the technical results will be assayed at future FCC hearings to determine whether the mobile service frequencies will be made available to the telephone industry on a common carrier basis or to private transportation industries for their individual or group use. Under questioning by Rep. George W. Andrews (D., Ala.) Commissioner Jett stated that doctors will file for the mobile service under the Citizens' Radiocommunications Service but that "it could be under general mobile too." The FCC report also noted the urban mobile service now available in New York and Boston is on an emergency basis.

## 200,000 Walkie-Talkies Forecast for Public

Declaring that for the first time the Government is now able to provide a radio license to a private citizen for his own personal convenience, Commissioner Jett in his appearance before the House Committee stated the rules and regulations for the new Citizens' Radiocommunication Service will be ready in February or March. The FCC expects to license 200,000 sets of the light-weight "walkie-talkie" variety to be utilized by doctors, hunters, fishermen, surveyors and industries such as express agencies, laundries, bus lines and dairies. It was added, however, that the wide use to be made of the service would not permit assignment of exclusive frequencies. Commissioner Jett also interposed there was no urgency for the Commission to get out rules for the service as manufacturers are not ready to put the equipment on the market.

## LaSalle Map of Business Conditions


Change from a year ago...
Up 10 to 15 %
Up 0 to 9 %
Down 6 to 0 %
National Average Up 7 %
For February, 1946
Business Bulletin
LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution

**The volume of trade has continued to hold up well, due largely to the high level of consumer buying. Even the slowing down in industry caused by widespread labor disturbances and the difficulties of reconversion to peacetime production have not been enough to pull business volume in many lines below last year's high level, according to LaSalle's analysis. Indications are still promising for a good year, unless interruptions are more extensive and last longer than is now expected.**

# TELEPHONE ENGINEERS

## *Enlightened at* RADIO *Convention*

By B. C. BURDEN, Technical Consultant

ONE of the outstanding technical events of the season was the mid-winter meeting of the Institute of Radio Engineers in New York during the week of January 22 to 26. The meeting was attended by the largest group of engineers ever to assemble for a convenvention of this type.

Many of the technical papers covered subjects heretofore completely "blacked out" for reasons of military security. In addition to the many technical papers read at the convention there was room after room of exhibits which gave ample evidence of the amazing technical progress in both the radio and electrical fields which has resulted from the war. Everything from the latest radar systems to color television was shown at the meetings. That radio and electronics is no longer "the other fellow's game" was evident by the many telephone engineers present at the meeting.

It is interesting to note that after the last war radio telephony, almost over night, became popular as a source of home entertainment. At that time there were many predictions that radio channels would do away with wire telephone lines. This of course never came to pass. Radio was pressed into service for certain telephone uses for which it was ideally suited, as for example, trans-oceanic telephone service, ship to shore service and other similar applications. However, it received little or no use in connection with domestic local or toll lines.

This was largely because the knowledge of radio during the period 1919 to 1930 embraced primarily the longer waves (lower frequencies). The longer waves did not lend themselves to such uses as short haul toll, urban mobile or rural subscriber services. Technically it was possible to use them for these purposes but it was impractical to do so, as their characteristics were such as to cause them to radiate in all directions and for many miles from the area in which they were used. This resulted in interference between channels on the same frequency and relatively few channels were available.

But a different situation prevails at the end of World War II. The necessities of modern warfare have pushed back the frontiers of technical knowledge so that techniques and equipment are now available which will permit telephone companies to use radio channels for many short distance purposes not heretofore considered practical. The extent to which radio may take its place beside wire lines is anyone's guess. But we can be certain that it will play a much more important part in the telephone business in the future than it has in the past. This was plainly evident to the telephone engineers in attendance at the IRE convention as they viewed

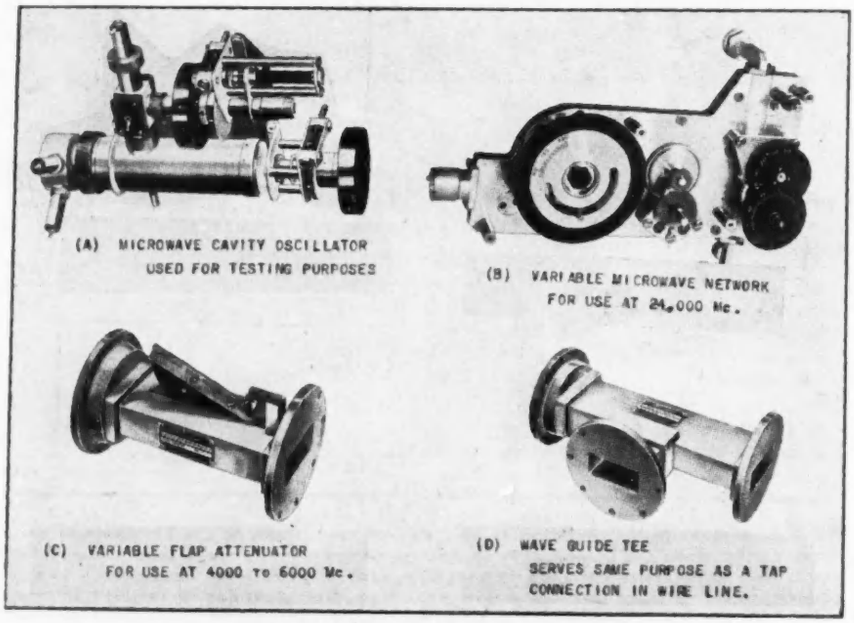

(A) MICROWAVE CAVITY OSCILLATOR USED FOR TESTING PURPOSES
(B) VARIABLE MICROWAVE NETWORK FOR USE AT 24,000 Mc.
(C) VARIABLE FLAP ATTENUATOR FOR USE AT 4000 to 6000 Mc.
(D) WAVE GUIDE TEE SERVES SAME PURPOSE AS A TAP CONNECTION IN WIRE LINE.

Fig. 1—Microwave plumbing (wave guides) on display at the IRE convention.

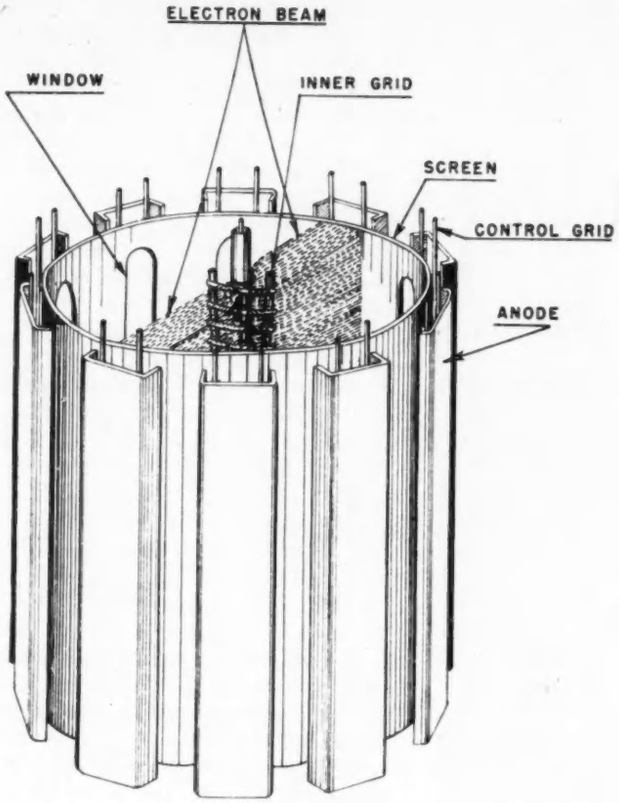



Fig. 2—Structure of radial beam tube elements (Courtesy National Union Radio Corp.)

the many new developments in the radio art which are directly applicable to the telephone field.

### *Equipment Exhibits*

Exhibits at the IRE meeting ranged from working television demonstrations to many strange new tubes which were being shown to the public for the first time. An inspection of the various exhibits was sufficient to convince the most skeptical that we have, from a technical standpoint, advanced the equivalent of 20 years of normal progress during the war period.

Typical of the more interesting exhibits were those of "microwave plumbing" similiar to the items shown in Fig. 1. At first sight these units don't make sense but they are highly efficient and indispensable at microwave frequencies. The units shown are used for various purposes such as testing, line coupling, etc.

### *The Radial Beam Tube*

National Union's exhibit of a *radial beam tube* attracted the interest of telephone engineers. This tube can be used for high speed switching and commutation without moving mechanical parts. A tube of this type is useful in communication systems employing the time division multiplex principle. The tube on exhibition was capable of controlling up to 10 circuits. The general features of the tube are shown in Fig. 2. A rotating magnetic field is employed to focus and rotate the electron beam so that it passes through each aperature window and operates the associated control grid. By means of a special circuit one half of the beam is suppressed so that only a single beam is involved.

Two types of tubes are available. One functions as an *input tube* and the other as an *output tube*. The magnetic rotating field is supplied from a single phase source by a phase splitting arrangement. This rotating field is applied to a polyphase wound stator similiar to those used in a-c motors. This fits snugly around the outside of the tube. The essential difference between the signal input and signal output types of radial beam tubes is shown in Figs. 3 and 4. It is possible that many interesting applications will be found for this tube in the telephone field.

### *Klystron Tubes*

The Sperry Gyroscope Company had an unusually interesting exhibit of their *klystron tubes*. These tubes have played a very important part in war equipment and until recently information concerning them was completely restricted. The klystron tube (see Fig. 5) operates on an entirely different principle than the ordinary vacuum tube. It is able to work at frequencies far above those at which ordinary tubes can work. Klystrons are available to cover almost any desired range from as low as 750 megacycles to above 10,000 megacycles. Fig. 6 shows the cut-away view of a typical klystron. It also shows a klystron equipped with a special micrometer tuner. Klystrons are playing an active role in the development work now under way in the region above 1000 megacycles and may some day be as common to telephone men as the three element voice repeater tube.

### *Summaries of Technical Papers*

Those technical papers which were delivered at the IRE technical meeting and which have significance in the telephone field and which are of interest to telephone engineers have been briefly summarized in the paragraphs on the following page.

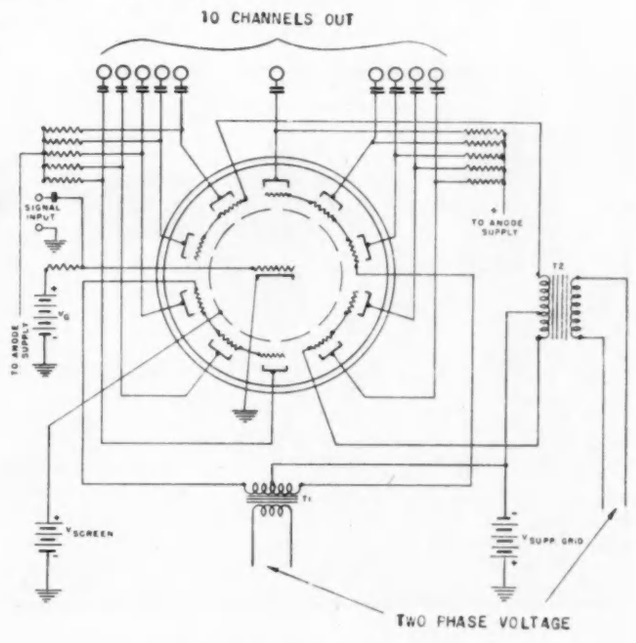
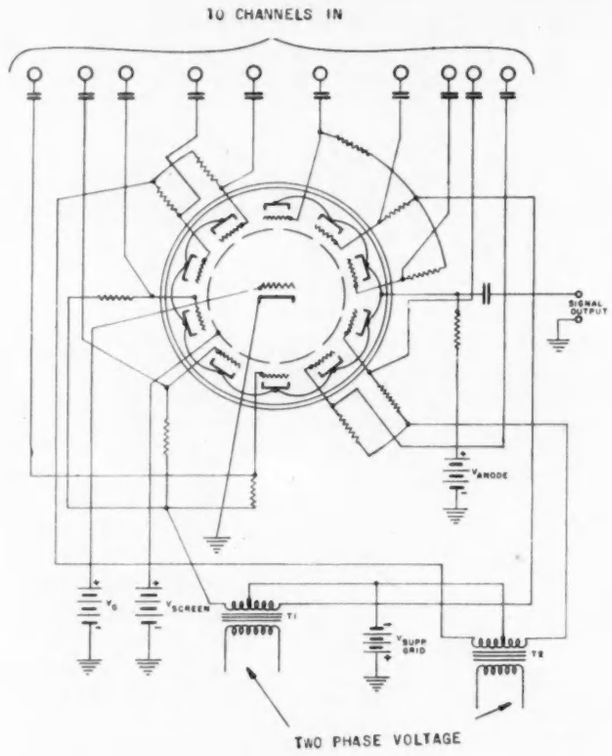



Fig. 3—Radial beam tube of the signal output type (Courtesy National Union Radio Corp.)

SIGNAL OUTPUT TUBE CIRCUIT




SIGNAL INPUT TUBE CIRCUIT

Fig. 4 — Radial beam tube of signal input type (Courtesy National Union Radio Corp.)

*Broad Band Antennas*—This paper discussed newly designed broad band antennas for use on the very high frequencies. These antennas are usable over wide frequency ranges without antenna adjustments and have a pick-up sensitivity comparable with that of an ordinary dipole. Antennas of this type may have application in the telephone field where multi-channel operation is obtained from a single carrier by means of super-imposed wave filter type multi-channel carrier systems.

*Microwave Magnetrons*—Magnetrons are vacuum tubes of a type especially useful for application in the ultra and super high frequency ranges. It is these tubes and klystrons that will make feasible the use of microwave radio channels in the telephone field for toll and other purposes. This paper reviewed the principles of operation and details of construction and discussed the use of magnetrons for continuous wave purposes.

*Technical Developments in Light Wave Communications*—Talking on a beam of light is not a new idea but like everything else this art has been greatly improved during the war. This paper discussed new types of light energy radiators, filter developments, convertor tubes and receiving elements. Although it is unlikely that light beam communication channels will be employed in the telephone field, it is at least possible that they may find some application in our business. (Editor—Discussion of light beam techniques always brings up the unanswered question "would an F.-C.C. station license be required for operation of a light beam communication channel?")

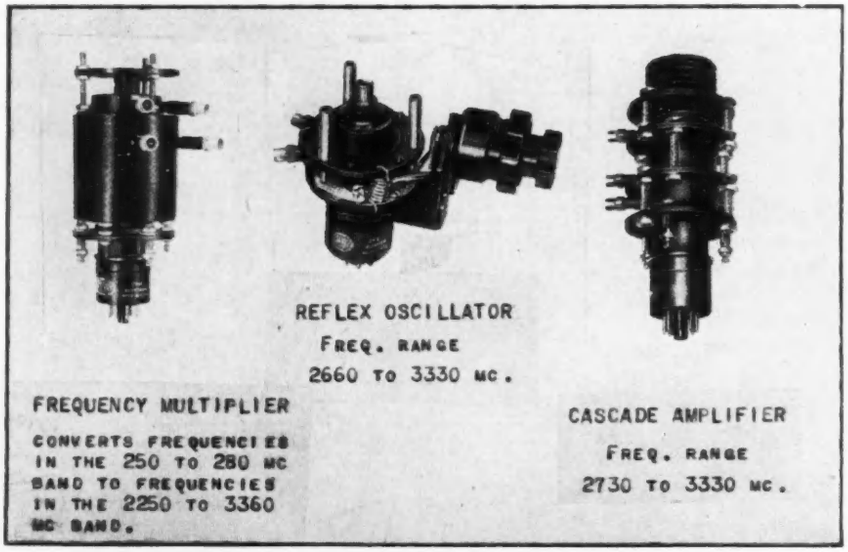

REFLEX OSCILLATOR
FREQ. RANGE
2660 TO 3330 MC.
FREQUENCY MULTIPLIER
CONVERTS FREQUENCIES IN THE 250 TO 280 MC BAND TO FREQUENCIES IN THE 2250 TO 3360 MC BAND.
CASCADE AMPLIFIER
FREQ. RANGE
2730 TO 3330 MC.

Fig. 5—Typical Klystron tubes of various types (Courtesy Sperry Gyroscope Company).

*Copyright 1945 by Sperry Gyroscope Co.*

*Microwave Triodes Adapted for Commercial Usage*—Another wartime development of interest to telephone companies is the *light house* or *planar grid* triodes. In a paper covering these tubes the author points out that they are useful for both continuous and pulse wave operation and that they will operate at both microwave or at lower frequencies. Tubes of this type may find wide application in transmitting and receiving sets used for telephone field applications in the range above 300 megacycles.

*Metal Lens Antenna*—From the viewpoint of the telephone man, a paper presented by W. E. Kock of Bell Telephone Laboratories, on their newly developed *lens antenna* proved to be the most interesting feature of the convention. This new type antenna is characterized by its ability to focus radio waves into very narrow beams. It is capable of producing beams whose angular spread at the transmitting point is only one half degree wide. A beam of this width would be spread out only 0.174 of a mile at a point 20 miles from the transmitter.

The lens antenna consists of a metal horn with the mouth closed by a metal grill consisting of a number of conducting plates of proper shape and spacing. It thus constitutes a lens whose focusing action is due to the high-phase velocity of a wave passing between the plates. The antenna itself is located in the throat of the metal horn.

Its field of usefulness is primarily at frequencies above 1000 megacycles although it can be used successfully with frequencies as low as 56 megacycles.

*Microwave Radio Relay Equipment*—Another paper of significance to the telephone field was one describing the army's multi-channel pulse-time-division communication radio systems. These systems, though extremely compact, permit eight voice channels on a single (broad band) carrier frequency. The author predicted wide use in the telephone field.

*From Wiring to Plumbing*—To telephone men brought up on wire circuits and low (voice) frequencies it was somewhat difficult to become accustomed to the fantastic shapes and types of

(Please turn to page —)

# Personalities

**Stanley B. Lockwood,** manager of the Mondovi (Wisc.) Telephone Company, recently went to Washington and personally presented statements to the Wisconsin members of Congress to show the effect of the proposed wage rates on telephone companies in Wisconsin. Good work, Mr. Lockwood.

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**Ray Lloyd,** eastern New York representative of Automatic Electric Sales Company, has acquired an interest in the West Winfield (New York), Lewis & Hall and Midstate Telephone Companies. He is associated with **A. T. Jones** in the operation of the properties.

●

**Thomas N. Lacy,** former vice president and general manager of Michigan Bell, is the new president, succeeding **G. M. Welch,** who retired January 31. **Ben R. Marsh** is the new vice president and general manager.

●

**Dr. Lee De Forest,** called the "father of radio," will be honorary chairman of the World's Invention Exposition in Chicago, April 11 to 22, when manufacturers will be looking over the new inventions of every field. Inventors may obtain applications from the exposition offices at 155 N. Clark St., Chicago 1, Ill.

●

**L. W. Nath,** Rheinbeck, Iowa mgr. for Central Iowa Telephone Co., has now metalized some of the telephone lines around Rheinbeck and accomplished that part of his postwar program.

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**Endsley Jones,** Kingfisher, Oklahoma, is the new president of the Oklahoma Telephone Association for 1946 and succeeded **John Holt,** Stillwell, Oklahoma. Only other changes are **Forrest Hand** as 1st vice pres. and **W. T. Autry** as 2nd vice pres.; **H. W. Hubenthal** and **E. B. Jeffrey** are serving again as secretary and treasurer respectively.

B. C. Burden

**B. C. Burden,** technical consultant of Lincoln, Nebraska and well known author on telephone and radio subjects, was recently elected a full member of the Institute of Radio Engineers. He is also a full member of the American Institute of Electrical Engineers. Mr. Burden spent the week of Jan. 22 to 26 in New York attending the annual technical convention of the two groups.

●

**W. A. Sager** of Fabens, Texas has purchased the Columbus (Mo.) Telephone Co., from **A. J. Evans,** who has operated it for the past twenty years. Mr. Sager expects to start improvements as rapidly as materials become available and put all the profits of the company back into the firm in order to improve service as rapidly as possible.

●

**Charles Jessup,** district manager of United Telephone Co., at Franklin, Indiana, reports two new Stromberg-Carlson switchboard positions are to be added to the Franklin exchange as soon as delivered. Last April a complete new manual system was installed with WPB permission, which limited the company to six positions.

Dr. **Frank B. Jewett,** president of the National Academy of Sciences, and **Paul Porter,** FCC chairman, were among the featured speakers at the Institute of Radio Engineers' 1946 Winter Technical Meeting, Hotel Astor, N. Y.

●

**B. L. Fisher,** president of Lee Telephone Co., Martinsville, Va., believes that many people have never known the value of a telephone and that now, while they have the money and the desire, is a fine chance to acquaint them with its value. Lee Telephone Company employs three times as many men as during the war and is rapidly building new lines to take care of an enormous rural subscriber demand.

●

**Aubrey A. Woolford,** engineering department of Inter-Mountain Telephone Co., Bristol, Tenn., who was a major in the Signal Corps, has been notified that he has been promoted to lieutenant colonel.

●

**William H. Harrison,** vice president in charge of the operation and engineering department of the American Telephone and Telegraph Company, was awarded the Hoover Medal, Jan. 23 at the annual winter convention of the American Institute of Electrical Engineers in New York.

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Lt. Colonel **Orla St. Clair,** who is now the San Francisco partner of the law firm of Wheat, May, Shannon & St. Clair, was awarded the Legion of Merit January 22 for his services in the Signal Corps as Chief of the Special Planning Branch of the Corps' Plans & Operations Division. The medal was presented to Col. St. Clair by Major General **H. C. Ingles,** Chief Signal Officer.

●

**B. W. Ammerman,** owner of the Scotia (Nebraska) Independent Telephone Co., hopes to have dial system telephones for their subscribers in about a year's time.

# Minnesota Convention

By RAY W. SMITH, Editor

THE 37th annual convention of the Minnesota Telephone Association was held January 28, 29 and 30 at Hotel St. Paul, St. Paul, Minnesota. The first state telephone convention in 1946, Minnesota's registration of over 100 more in attendance than was expected was a fine start for 1946 conventions. Colonel Wm. C. Henry, president of United States Independent Telephone Association, headed a group of prominent speakers for a most excellent program.

Charles Cashel, secretary and manager of the Worthington Telephone Exchange Co., was elected president succeeding Warren Clay of the Hutchinson Telephone Co. Mr. Clay was re-elected last year and served with distinction. Mr. Irving Todd, secretary and treasurer, Hastings Telephone Co., was elected vice-president succeeding H. F. Lueders, Norwood, who has retired from the telephone business. J. C. Crowley, Jr., perennial secretary-treasurer, was re-elected.

W. B. Clay, left, retiring president, greets president-elect Charles Cashel.

A group of the officers and directors of the Minnesota Association snapped before the annual meeting of the board.

Board of directors of the Association are: Mr. Cashel; Mr. Clay; Mr. Todd; G. M. Dwelle, Dwelle Telephone Co., Lake City; W. A. Eckles, Blue Earth (Minn.) Telephone Co.; P. M. Ferguson, Citizens Telephone Co., Mankato; P. Glaeser, Waconia; J. P. Keane, Pine Island (Minn.) Telephone Co.; Carl Ostby, Erskine; Vies Martinsen, Sebeka Telephone Co.; F. C. Marvin, Zumbrota (Minn.) Telephone Co.; Fred Pfaender, New Ulm Rural Telephone Co.; S. A. Rask, Intercounty Telephone Co., Blooming Prairie; H. P. Sentman, Fairmont (Minn.) Telephone Co. and H. James Boyd, Alexandria Telephone Co. Mr. Boyd and Mr. Ostby were the new directors named succeeding H. F. Lueders and the late Leland Wright.

Retiring president Clay called the meeting to order with his annual address. Mr. Clay, in relating the activities of the Association, notified the Association that during the year, rate schedules of twenty companies were revised and approved although the OPA deemed it advisable to intervene in several proceedings. After hearings, favorable decisions were rendered in each instance.

Mr. Clay paid tribute to the USITA for its beneficial work. He especially stressed the work of Toll Compensation and Settlements Committee, the Plant Committee, the Employment Relations Committee and the USITA Advertising Committee. Although not specifically naming other USITA committees, Mr. Clay explained it was only because he was not as familiar with them. He also traced the activities of the Minnesota Association and its services to its membership.

The subject "Radar and the Telephone" was handled by W. E. Pothen, executive assistant, Northwestern Bell Telephone Co., St. Paul. This address was most interesting and gave a complete picture of the wartime development of radar and its uses for peacetime.

Telephone Engineer's v.p. Don Sorensen, (left) Elinor Bishop of Telephone Advertising Institute and Wm. C. Henry, USITA president, at the Minnesota convention in St. Paul.

C. C. Pearce, Riceville, Iowa, and a member of the USITA Advertising Committee, reported on the subject of advertising. On the last day of the meeting, his report was supplemented by Leon Roberts, Chicago, chairman of the committee.

E. H. McGarvey, representative, Northern States Power Co., St. Paul, informed the convention on the subject "Joint Use." Readers of this publication are well familiar with this subject as feature articles have appeared recently on this phase.

At the second-day session G. W. Anderson of the Internal Revenue Service, St. Paul, was the first speaker. His explanation of miscellaneous taxes was very informative and resulted in many questions from the floor.

Gordon Volkenant, research engineer, Minneapolis-Honeywell Regulator Co., was the feature speaker for this portion of the program with the subject "Electronics—The Magic of War and Peace." His subject was so interestingly presented that he held the entire convention spellbound. Tracing electronics from its birth to its hundreds of applications as now used, Mr. Volkenant was held at the speaker's table for well over two hours and standing room only in attendance. It is hoped that this speaker will be heard at the national convention of USITA next October.

Hon. Edward Thye, Governor of Minnesota, made the closing address of the morning session.

The afternoon program introduced another outstanding Minnesotan, Stafford King, state auditor. His subject "Experiences in the Pacific" was a powerful dissertation on the effects the recent war would have in our peacetime world. Mr. King gave a complete report on all branches of the services.

The feature speaker, Col. Wm. C. Henry, president of USITA, was the afternoon highlight. In order, Col. Henry outlined twelve points regarding the telephone business of interest to all Independent telephone people.

(1) He urged that all materials be ordered well in advance for construction or maintenance work to give manufacturers ample time to deliver necessary equipment. (2) Fill demands for service as quickly as possible. (3) Details regarding proposed legislation setting up a Rural Telephone Administration. (4) Minimum wage bills now before the Congress. (5) A higher level of rates must be obtained to continue adequate service to subscribers. (6) Explanation of USITA work on new toll contracts. (7) Dial Interexchange Committee work and its meaning to the industry. (8) USITA Plant Committee actions. (9) Advertising Committee accomplishments. (10) Toll dialing and its use by Independent telephone companies. (11) Uses of radio by Independent telephone companies and USITA actions before FCC on radio channels, and (12) Prediction that demands for service will increase as the year progresses.

N. H. Saunders, chief engineer, Kellogg Switchboard & Supply Co., Chicago, was the closing speaker for the second day on the subject "Manufacturers' Problems." It was brought out by this speaker that reconversion problems were many for the manufacturers and that all Independent suppliers were doing their best to provide equipment to their customers as quickly as possible. Mr. Saunders reminded the telephone operating people that during wartime it was necessary to substitute many synthetic materials to use and that the very same problem in reverse was necessary now to bring equipment up to prewar standards by converting synthetic products back to the time-tried metals and quality all telephone people expect.

Vies Martinsen, H. E. Clayton and P. M. Ferguson (from L to R) on the board of experts leading a discussion during the open forum program.

During the evening of January 29, a banquet, entertainment and dance was held with the largest attendance ever to gather for that occasion. J. R. Dooley was chairman of the committee.

Each year the Minnesota Association devotes its final morning program to an open forum meeting. This year A. N. Fancher, supervisor of telephones, Minnesota Railroad & Warehouse Commission, St. Paul, was the first speaker on "The Importance of Proper Accounting Methods." Mr. Fancher is familiar with most every operating telephone man in Minnesota and his subject was of utmost importance. T. C. Macoubrey handled the open forum on the subject "Answers to Accounting Problems."

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Automatic Electric's Stan Sherman, left, and Cook Electric's Chet Ruth, right, conferring with Central Telephone Company's chief engineer, Paul Lyday, center.

Conducted by the
Observer and his Gang

# THE Observation Tower

***If you have observations or even a friendly bit of argument suitable for use in this column, you are invited to send them along, which automatically makes you a member of the Gang. You will be anonymous—no names of telephone people or telephone companies are used in this column. Address "The Observer," in care of TELEPHONE ENGINEER AND MANAGEMENT.***

### *Give the Little Guy a Break*

GANGSTER No. 112 has pointed out to us that the telephone business is the only regulated business in this country that has a large number of small, or even very small, units subject to the same kind of regulation as the very largest units in the business.

He refers, of course, to permanent commission regulation; not to more-or-less temporary wartime regulation of the kind that has affected many industries.

This Gang Member thinks that maybe the laws creating and fixing the obligations of regulatory commissions should make some sort of differentiation as between small telephone companies and the very large companies—a distinction that would go further than merely classifying companies on the basis of their average gross operating revenues, as is done now mostly for accounting purposes.

He says that under the present laws whenever a commission raps the knuckles of large telephone companies, the small company gets a part of the rap. This, he thinks, is because the same basic rules of regulation apply whether the telephone company has 100 telephones or a million.

In other words, if a commission makes a ruling which establishes basic principles upon which that commission will determine the rate base for the purpose of fixing rates and the rate of return, that ruling applies to the smallest as well as to the largest telephone company within that commission's jurisdiction. And—since commissions don't usually go out of their way to knock the ears down on the Squeedunk Telephone Company with 68 stations or so—they are usually aiming, when they make such rulings, at the big telephone companies in their jurisdiction. But, regardless of whom they are aiming at, the little company is also hit.

The fact is, says this Gang Member, commission regulation is based principally upon the situation of the large telephone companies. The little telephone company is just a sort of innocent bystander. Commissions are usually fairly sympathetic to it, but it is caught, just the same, in the net of regulatory theories and acts that are designed principally to deal with the big companies.

We don't really like to try to think out things as complicated and subtle as this—it interferes with our leisure. But we do admit that the telephone industry is the only permanently regulated industry in this country that has in it so large a proportion of small businesses that are subject to the same basic principles of regulation as the large businesses of the industry.

We agree, too, that the difference between a telephone company with, say, a million telephones, and one with fewer than 100 telephones, is as about as great as the difference between the United States Steel Corporation and the village blacksmith.

Why, asks Gang Member No. 112, shouldn't all little telephone companies—those, say, with 250 stations or fewer—be freed entirely from regulation? Let them charge whatever rates they can get—which won't be much. If their service is not satisfactory, let the public they serve deal with them.

This brings up a lot of new kinds of questions of course. It reminds us of the old story of the fellow who was president of a railroad 21 miles long. He sent an annual pass on his road to the president of the Pennsylvania railroad and asked for an annual on the Penn in return. When the Pennsylvania president refused to cough up an annual on his road, on the grounds that the little local railroad did not quite compare in length with the larger road, the president of the small road agreed with that fact. "But," he said, "even if my railroad isn't as long as the Pennsylvania, it's just as wide!"

On the other hand, there can be some question as to whether precisely the same principles of regulation should apply to the very small telephone company as to the very large one. There is a great difference, in many ways, between the two, and that difference is not fully compensated for by merely applying a simpler method of accounting to the small company.

Someday maybe, a Moses will come along who will lead these little telephone companies out of the regulation wilderness by applying to their case some simple set of regulatory rules that will be sufficient to satisfy the overall philosophy of the necessity of regulating businesses with a broad public interest, but will also deal with the small companies as what

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they are—little businesses that should be dealt with as such, and not made subject to principles of regulation that are tailored to fit the very large companies.

### *Live and Learn*

GANG Member No. 33 has bothered us a good deal lately with his ideas about the future. We're just as much interested in the future as anybody, but right now we've got on hand a plethora of pressing problems about the present. Like a lot of other people, we're somewhat in the fix of the guy who said he wasn't going to do any worrying about what was going to happen next Wednesday, because he was being hung next Tuesday.

Gangster No. 33 thinks that, with all the new-fangled things being introduced in the telephone business—radio and such—telephone men have got to start learning a lot of new things they've never had to be experts on before. He wonders just how they're going to learn all these new things—and where.

He points out that telephone companies are getting into mobile radio, such as telephones in automobiles, and into "line-of-sight" radio for point-to-point-conversations, and into carrier current and what-not. Somebody in the telephone business, he says, has got to know how to run these added things, and also how to maintain the new kinds of equipment that will have to be added to the telephone plant in order to supply these various kinds of new services.

He thinks the telephone man of the future will have to be a sort of "teleradio" man, with a lot of knowledge that had no necessary place in the telephone business in past years. He is personally worried about the situation because, he says, all he knows about the practical aspects of radio, right now, he could put in one corner of his left eye.

We have a good deal of sympathy for this Gangster, because we are in about the same fix as he is—and as a lot of other telephone people are, also. But we're not worried about it.

We think these new and strange things will be integrated into the telephone business slowly enough that any telephone man can keep himself abreast of the fundamentals of them as they come along. If the man is the big boss, about all he needs to know are the fundamentals, anyway. He doesn't have to know how to install and maintain the newfangled apparatus himself—any more than the big bosses of the past have had to know how to go out and personally splice a cable.

As to the technical and actual operational details of these things—well, there are plenty of young fellows in this country who have got this radio business at their fingertips. A lot of them learned it in the services during the war. They'll be good men to bring into the telephone-radio business. We need young fellows like that, anyway.

We don't know anything about radio, either—excepting that the receiving set in our bedroom quit cold the day the Japs hit Pearl Harbor, and nobody has ever been able to make it work since that time, but we've got a lot of confidence in the technical sharps in the business who have made a study of radio. We propose to let them run the technical and operating end of the radio part of the telephone business—and we'll just keep on watching the earnings statements and balance sheets!

### *Help! Help!*

TO be in keeping with the times, we've organized for ourself a Fact Finding Committee, also an Advisory Board. We've given each of our Fact Finders a crystal ball and have told them that if they can find any facts about the telephone business that should be explored, they are to relentlessly pursue such facts to the bitter end—and then report.

As to our Advisers, we expect to pay them nothing—and we'll probably get value received.

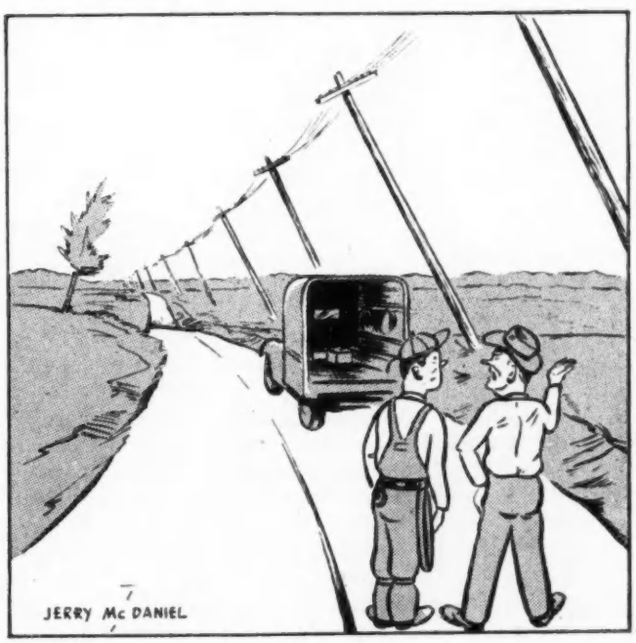
Immediately on his appointment, our Head Adviser went into a trance, gave his subconsciousness full play, and came up with the suggestion that somebody should explore the future of toll rates—and, particularly, the effect of the probable future of toll rates on Independent telephone companies.

He thinks the telephone industry should be specifically interested in what he calls the philosophy of continued and almost yearly reductions in toll rates. He fears that if these reductions are continued, yearly and year after year, some Independent companies are going to be eventually in the position of the clothing store owner who lost a dollar on every pair of pants he sold—and who could keep going only because he sold so many pants.

He also wonders when the Independents are going to be asked their opinions, in advance of agreed-upon toll rate reductions, as to what the deal will do to them.

We've turned the problem over to our Fact Finders. If and when they come up with anything, we'll let you know.

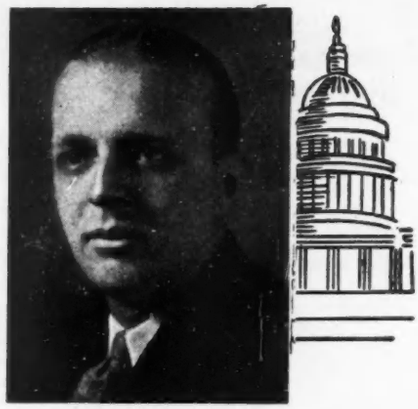
Telephone Engineer — Jerry McDaniel




Don't tell me the wind was blowing that hard.

***Roland C. Davies***

Editor
Telecommunications Reports



# *Our* WASHINGTON *BUREAU Reports*

### *Trends*

**Labor problems still constituted the major issue of the telephone industry in Washington during the first half of February just as in the initial month of 1946. Intertwined with the wage increase negotiations in the Bell System and the threat of a nationwide strike was the minimum wage legislation, now before Congress, which if enacted in its present form, would greatly increase the pay costs of the industry especially the Independent companies.**

The Independent industry, however, scored a notable victory in the minimum wage legislation by the inclusion in the pending Senate bill of an exemption for switchboard operators in exchanges of up to 1,000 stations. As we went to press, the Senate bill had not been reported out in final form, but its original proposal was a boost of the minimum wages, now at 40 cents an hour, to 65 cents an hour and graduated rises of 70 cents and 75 cents successively over a five-year period. The predominant speculation, nevertheless, is that Congress will not approve such an increase and the final minimum wage,—if any legislation is enacted—will be 50 cents or 55 cents an hour.

**Through the representations to the Congressional committees, charged with drafting this legislation, by the U. S. Independent Telephone Association, the Independent industry was the only branch of American business to receive favorable consideration for its problems.** It was able to get the exemption doubled from the previous Fair Labor Standards Act that had only allowed switchboard operators in exchanges of up to 500 stations to be exempted from minimum wages and maximum hours. On the other side of the communications fence, the telegraph industry—Western Union—received more drastic treatment. For example, the granting of a lower minimum wage for messengers than the proposed 65 cent rate was left to the discretion of the Wage Hour Administrator and the employment of messengers of minor age had to be approved by the Director of the Children's Bureau of the Labor Department.

The wage negotiations in the Bell System by the affiliated unions of the National Federation of Telephone Workers has been progressing satisfactorily during the past three weeks so that it appeared the clouds of strike threats might be disappearing. But there was still an enigma in this situation because the NFTW Presidents' conference was meeting during the week of Feburary 17 at Memphis to map future strategy of the labor organizations in the telephone industry. Whether this would result in strike action could not be forecast accurately, but the leadership of the NFTW has been insisting that it wished to avoid a walkout because of the public reaction and disruption to the service. Thus, unless this viewpoint is radically changed, our best guess is that no strike will result.

Meanwhile, the National Wage Stabilization Board is currently making an effort to get a member of the telephone industry to participate in the deciding of around a score of voluntary wage increase applications involving the question of rate relief from the Independent industry. Seventeen of these wage applications are carry-overs from the old War Labor Board's National Telephone Commission and there have been three new applications since the National Wage Stabilization Board was established.

Because the House ways and Means Committee is now busy on changes in Social Security taxes, no immediate action is in sight on the Knutson bill which proposes the termination of the wartime increases in the excess tax rates on long distance telephone, telegraph and local telephone bills. Rep. Knutson of Minnesota, ranking Republican on the committee, has proposed the termination of these wartime excise increases by July 1 with the reduced taxes to be carried on the bills rendered on or after the first day of August, 1946.

**The new War Assets Administration, which will come into being the last part of March to absorb the Surplus Property Administration and the RFC agencies handling surplus disposals, is expected to emphasize more and more direct sale of military telephone and telegraph equipment to the industry. The sale through bidding from the industry of telephone instruments, which closed Jan. 25, was very successful.**

### *Supreme Court Upholds FCC*

**Following the doctrine which has prevailed in its judicial thinking in the past decade of not upsetting rulings of regulatory commissions unless complete arbitrariness by the latter has been demonstrated, the U. S. Supreme Court by a 5-1 decision, upheld all contentions of the Federal Communications Commission in its accounting case against the New York Telephone Company, reversing the unanimous decision of the three-judge Federal statutory court in New York.**

**The opinion, written by Associate**

**Justice Rutledge (who in his previous post on the U. S. Circuit Court of the District of Columbia had almost invariably upheld the FCC), reiterated the highest tribunal's doctrine that "for a court to upset an accounting order it must be 'so entirely at odds with fundamental principles of accounting' . . . as to the expression of a whim rather than exercise of judgment," and stated that the FCC order in this case "is not of that character."**

Chief Justice Stone dissented from the majority opinion, agreeing with the court below that the FCC is bound by and has not complied with the stipulation to which it was a party which was approved by the Supreme Court in the American and Telegraph Company case.

The appeal to the Supreme Court involved an order of the FCC of Dec. 14, 1943, which required the telephone company to reduce its surplus account by $4,166,510.57 as an alleged "excess" cost in the purchase of instruments and toll plant from the A.T.&T. during the years 1925-28. The New York Telephone Company was successful in the New York Court in enjoining the order.

The Court evaded the New York company's contention that the original entries were legal when made, under the system established by the Interstate Commerce Commission, by declaring decision on this question unnecessary in view of the authority of the FCC to require the compay to restate its accounts, with a consequent elimination on its books of any excess over the net book cost to the A.T.&T. The telephone company also argued that, even though the Commission could require reclassification of accounts concerning property still on the books, it could not order a reclassification of entries for property which had been retired. The Court stated that the effect of this argument "would be to render the Commission powerless to write off much of the inflation caused by the oroginal accounting in this case."

The FCC's victory in the New York accounting case gave the Commission "carte blanche," in the opinion of its staff chiefs, to rule upon the alleged "profits" above original cost of plant in the inter-Bell System transactions on the 1927 sale of instruments to the Associated Companies by the A.T.&T., the transfer by Long Lines of intrastate toll plant to the Associated Companies and the purchase by Long Lines of toll plant from the System companies. These were brought out in the FCC Telephone Investigation. The New York Telephone Co.'s portion of these transactions was by far the largest of any Bell System company. The extent and speed of continued investigations and proceedings on these transactions are dependent, to a major extent, upon the size of the FCC accounting staff and additions to its legal force under the new appropriations.

Actually, the total amounts involved—the $14,359,799 in connection with the total alleged profits in the 1927 sale of instruments by the A.T.&T. to the System companies; $3,312,631 excess in 31 major plant transactions from 1913 to 1935 of intrastate toll plant by Long Line to the Associated Companies; and the alleged $6,194,577 profit to the Bell companies in 30 purchases by Long Lines of toll plant from 1913 to 1935—constitute a tiny drop in the bucket contratsed with the total Bell System's plant investment of more than 5½ billion dollars. Just as in the case of the New York company, the Interstate Commerce Commission has approved the accounting entries of these transactions at the time.

In fact, the Federal Power Commission was probably more anxious from the standpoint of its own regulatory powers than the FCC for a victory in the New York case. The Power Commission felt that, if the lower court decision had prevailed, its own probing and "writing off" of accounts of power and gas companies would have been jeopardized somewhat. In reality, all the decision will mean to the New York Telephone Co **will be revision of accounting entries and it is felt there will be no effect upon rates.**

## Convention Dates

**Texas Telephone Association, Adolphus Hotel, Dallas, March 11 and 12.**

**Kentucky Telephone Association, April 4 and 5; no place yet named.**

**Nebraska Telephone Association, Paxton Hotel, Omaha, April 9-10.**

**Iowa Telephone Association, Ft. Des Moines Hotel, Des Moines. April 11-12.**

**National Executive Conference, USITA, Edgewater Beach Hotel, Chicago, Illinois, April 16 and 17.**

**Ohio Telephone Association, Deshler-Wallick Hotel, Columbus, April 23-24.**

**Indiana Telephone Association, Severin Hotel, Indianapolis, May 1-2.**

**Illinois Telephone Association, Pere Marquette Hotel, Peoria, May 8 and 9.**

**Wisconsin Telephone Association, Park Hotel, Madison, May 14, 15 and 16.**

**New York Telephone Association, Hotel Onondaga, Syracuse, May 22 and 23.**

**Pennsylvania Telephone Association, Hotel Lawrence, Erie, June 4-5-6.**

**Michigan Telephone Association, Hotel Olds, Lansing, September 18 and 19.**

**USITA National Convention, Stevens Hotel, Chicago, Illinois, October 14, 15, and 16.**

**North Carolina Telephone Association, Pine Needles Hotel, Southern Pines, November 11 and 12.**

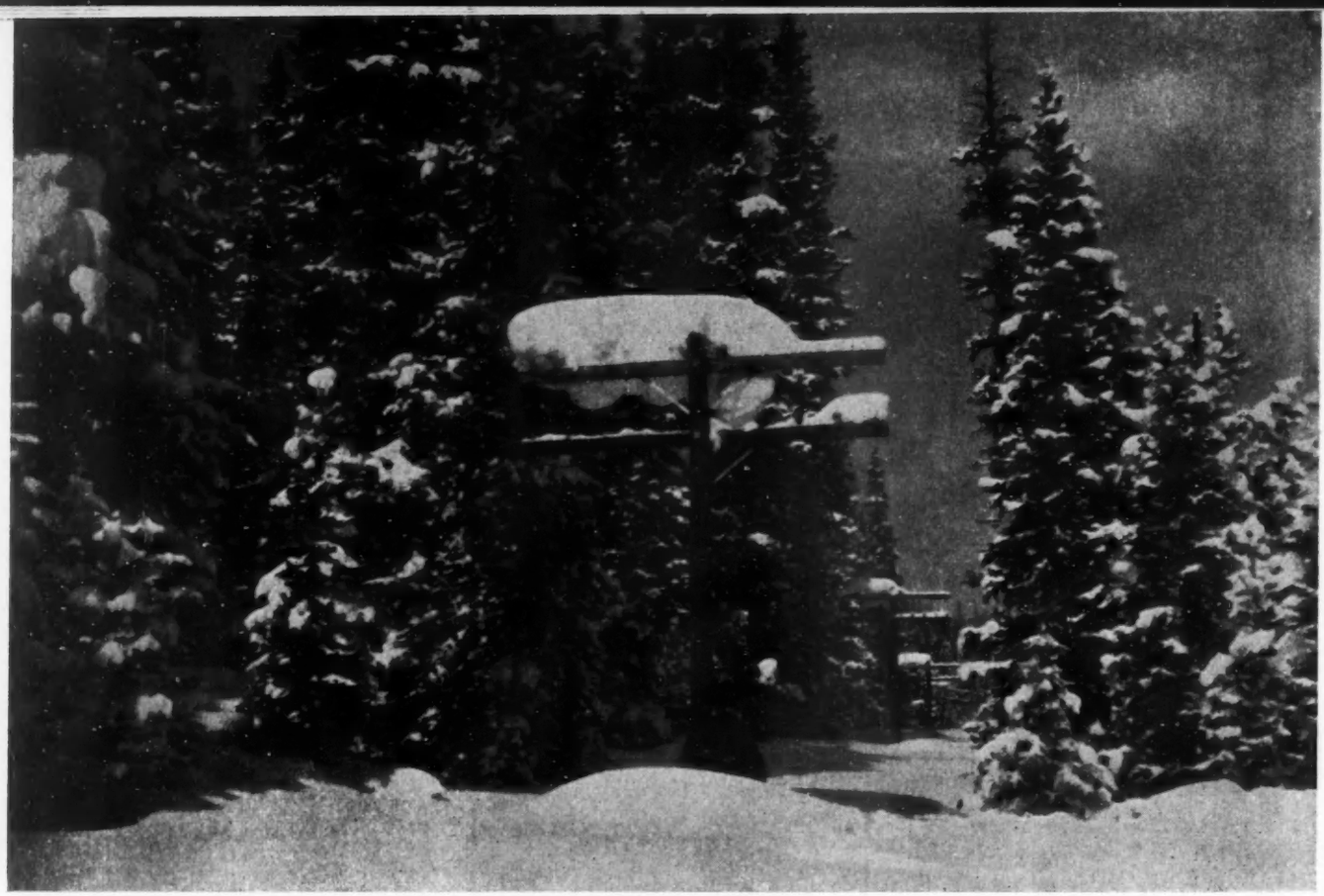
**Alabama Telephone Association, Jefferson-Davis Hotel, Montgomery, November 18 and 19.**

### *Washington Newspaper Opposes Recording*

**Often regarded as close to the FCC thinking and frequently a weathervane of Commission actions, the Washington, D. C. POST editorial recently on telephone recording devices was regarded as significant since it characterized recorder use in connection with the common and more vital every-day services of the telephone as "nothing but a menace."**

The editorial termed "the telephone in America as something more than a means of communication: it is a social institution." If telephone recorders were attached to lines confined to most impersonal business traffic, the POST editorial directed its fire at Soundscriber Corporation arguments for recorder devices on telephone lines as evidently in reply to some material sent to the newspaper by that company.

**(Please turn to page 69)**



Wintertime means hardships for most maintenance crews, but it is in the western areas that rugged and hazardous troubleshooting takes place. Sometimes it isn't the work that is so difficult; it's reaching the location that makes telephone repairmen inventive to reduce their struggles with the snow. Photo by Leo B. Krueger, district foreman of Mt. States Tel. & Tel. Co., on the Denver-Salt Lake route over Berthoud Pass at 11,000 feet above sea level.

# TRANSPORTATION *for Winter Maintenance*

ALONG with better materials and better methods of construction, as well as more effective maintenance, telephone plant is becoming more and more free from damage that results in the interruption of service.

However, we still have snow, sleet and floods, not to mention falling trees and other sources of damage that even the strongest practicable poles and wires cannot withstand. It is the maintenance and repair forces—men imbued with the tradition of getting the message through—who keep the voiceways operating regardless of winter hazards.

The Mountain States territory offers an abundance of difficult and unusual maintenance conditions that affect toll plant, and as a result some interesting methods of transportation have been devised to get to or near where repairs are required.

Some of the lines are routed through mountain passes and over rough terrain where it is necessary to provide shelter, food, fuel and bedding for the use of repair forces. Over some sections of line, coverage can be made only afoot with skis or snowshoes.

The snowplane and motor toboggan are among the unusual means of winter transportation. Snowplanes have been provided at Lander and Jackson, Wyo., as the two towns lie on opposite sides of the Wind River range and most of the road crossing the Two-gwo-tee pass is closed by snow throughout the entire winter. Snowshoes and skis are carried for use in close inspection of the line and for effecting repair work. Then across the Teton range west of Jackson, a motor toboggan is kept at Ashton, Idaho, for use on toll and rural maintenance work in that region when it is blanketed with snow that defies any other means of motor transportation.

These motorized snow vehicles are transported on a light pole trailer to the location where they are to be used.

*Our thanks to Stuart Shaw, editor of Mountain Tel. & Tel. Co.'s "Monitor" for the unusual transportation pictures and news on wintertime maintenance problems.*

A snowplane that is used out of Lander, Wyoming. It has a pusher type propeller drive powered by an aviation engine. J. A. Fegley, mgr. and Arthur Cottrell, combinationman, are shown here with skis and snow shoes strapped to the plane.

This snowmobile is sometimes used in clearing toll line trouble out of Baker, Montana under severe snow conditions, but for transporting material for repairs in winter on the toll line crossing the Teton mountains between Idaho and Wyoming a dog team occasionally must be used.

A motor toboggan at St. Anthony, Idaho, powered with motorcycle engine and used for rural and toll repairs and maintenance under heavy snow conditions. A cleated belt drive is located under the seats. Snowshoes are carried on the front end of the toboggan. In the lower picture the toboggan is being unloaded from a light trailer on which it was hauled to the point where roads are blocked with snow.

# DO YOU KNOW

Rates for telephone service to the Caribbean area and to Central and South America are, in general, one-half or less than one-half the rates in effect when the services to those areas were first established a decade or more ago.

✦

A.T.&T. has 673,000 stockholders.

✦

More than 27 million interconnecting telephones were in service in the United States in the middle of 1945 and making up this nationwide network are the local or wider systems of more than 6,000 telephone companies and about 60,000 rural or farmer lines.

✦

## Toughest Line Job

The toughest communication line maintenance job in the world is said to be that of keeping the Alaska Highway telephone line in operation.

Longest "carrier" telephone line in the world, it stretches from Edmonton, in Alberta, Canada, to Fairbanks, Alaska, and is maintained by the U. S. Army Signal Corps. Threats to continued operation are falling trees, landslides, forest fires, floods, avalanches, wind storms, snow and ice.

In some sections during icy weather soldiers constantly patrol the line knocking ice from the wires with clubs. This isn't always difficult, as the snow is sometimes 25 feet deep, so the wires are only several feet above the snow.

✦

It will take from two to five years before telephones are provided for all who want them, American telephone officials predict.

✦

A money order intended as payment for a Washington, D. C., telephone bill made the long trip to North Africa and Italy and back again before the subscriber learned that he had allowed it to get caught in the wrapping of a package he had sent to a friend overseas.

✦

More than half of all long distance and toll calls in the United States start or end in private branch exchange switchboards.

The telephone is composed of 248 pieces; 155,000 parts are required to supply the network that stretches beyond the instrument.

✦

## How Do You Shut These Things Off?

A timid 17-year-old Amish boy approached the telephone attendant at a railroad station in Harrisburg, Pa., with money in his hand to pay for a call, and pointed to the telephone saying: "How do you use these things?"

The attendant quickly offered to help him and the lad explained that he was supposed to get off the bus at Lemoyne, Pa., where he was to be met by a farmer on whose farm he was to work—but the bus didn't stop there.

For an hour and a half the attendant was unable to get an answer as she tried to call the farmer, but finally he answered and the situation was explained. The farmer asked to talk to the boy and the attendant took the youth to a booth, placed the receiver in his hand, and told him to talk into the transmitter.

The conversation lasted for some time. When the boy didn't reappear, the attendant went to the booth and found him still sitting there, almost dozing with the receiver against his ear—although the farmer had hung up!

✦

During the past 20 years the percentage of wire in overhead and underground cable in the Bell Telephone System has increased from about 48 to 85, and only 15 per cent of the 18 million miles of long distance lines operated by the system are open wire.

✦

One of the Signal Corps' toughest enemies in the Pacific was a form of plant life that attacks organic insulation. It is called fungus and is about the same kind of plant that causes athlete's foot. Thousands of tons of telephones, radios, switchboards and other items, for shipment to the Pacific, were fungus-proofed with a special lacquer. Each piece of equipment had to be disassembled, checked for possible repairs, made ready for packing and shipping.

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**TRIC**

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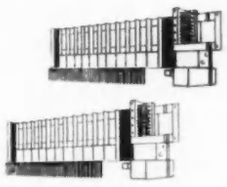
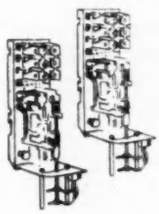
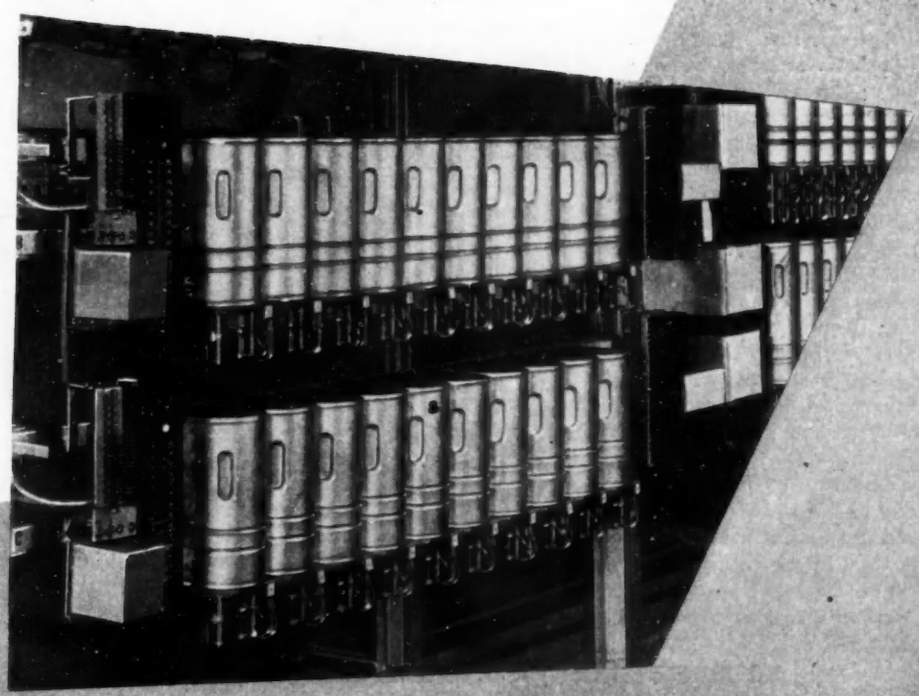
STANDARD FRAMES are rigid, welded-and-bolted steel structures of standardized design, upon which the switches and shelves are easily mounted.



STANDARD SHELVES provide mounting facilities and switch jacks, with all wiring completed to a terminal block at the end of each shelf.



STANDARD SWITCHES each comprise a complete switch mechanism with associated relays—wired, and with wiring terminated on a "jack" on the base.



# Telephone Engineer's RADIO COURSE FOR TELEPHONE MEN

Chapter 10
Section 3

# Standard AM Transmitter Circuits

By B. C. BURDEN
Technical Consultant
Lincoln, Nebraska

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### *The Station Monitor*

Connected to the output of the power amplifier is a unit called the *monitor*.

The station monitor consists of a detector, similar in construction to the detector in a radio receiver, into which is fed a small portion of the R.F. power from the final amplifier. The detector output is fed to a small audio amplifier and a loudspeaker, to provide a constant aural check on the performance of the transmitter. The loudspeaker is arranged to be readily switched from the output of the program monitor to the output of the speech amplifier feeding the modulator. In this manner the audio signal entering the transmitter can readily be compared with the audio signal leaving the transmitter and any distortion being created in the transmitter is immediately apparent.

### *The Frequency Monitor*

The FCC requires that broadcast transmitters maintain their frequency to within 20 cycles of the assigned frequency. Other types of radio services are also required to maintain their carrier frequencies within certain limits. This necessitates strict control of the frequency generated by the oscillator. In addition, an independent precision source of constant frequency is required to permit frequency comparison of the transmitter frequency with that of the standard. The frequency monitor usually consists of a crystal-controlled oscillator operating at the same frequency as the transmitter with arrangements provided to compare the monitor frequency with the transmitter frequency. Provisions are also made to check the frequency monitor against a primary standard maintained by the government.

The circuit diagram of a typical frequency monitor shown in Fig. 135 is a simplified schematic of a Western Electric type unit. Tube 1 is a crystal-controlled oscillator with temperature regulation, which operates at the same frequency as the transmitter oscillator. The output of this oscillator is coupled by capacitor C7, to the grid of the tube No. 2, which is an R.F. amplifier. The plate output of this tube is coupled to the primary of transformer T1. The secondary output of this transformer is connected to the grid of tube 4, which is so biased as to operate as a plate circuit detector.

Tube No. 3 is an R.F. amplifier fed by a small antenna which picks up a signal from the transmitter output. The plate circuit of tube 3 is also connected to the primary of transformer *T1*.

### *Operation of Frequency Monitor*

The operation of this frequency monitor is as follows: Assume the transmitter to be operating on a frequency of 1000 K.C. Hence a 1000 K.C. signal is picked up by tube *3* and applied to the grid of the detector tube (4). The signal is rectified by tube *4*, but, due to the high reactance of the relay *L1*, the R.F. plate curent is all shunted to ground by capacitor *C4*. At the same time the crystal oscillator tube (No. 1) is also generating a 1000 K.C. signal which is amplified by tube *2* and then passed on to the detector. Due to the high impedance of *L1*, the R.F. plate current in the detector due to the oscillator is shunted to ground by capacitor *C4*.

Now assume that some circuit disturbance exists in the transmitter so that its frequency is increased by 50 cycles. Under this condition, two signals, one of 1,000,000 cycles from the oscillator, and one of 1,000,050 cycles from the transmitter are simultaneously impressed on the grid of the detector tube. This produces a beat note of 50 cycles in the plate circuit of the detector tube (No. 4) and this 50 cycle current flows through the relay winding *L1*.

The relay *L1* is of special construction, having a vibrating arm *A* of such low mechanical inertia that it can readily vibrate at low frequencies. Hence, when

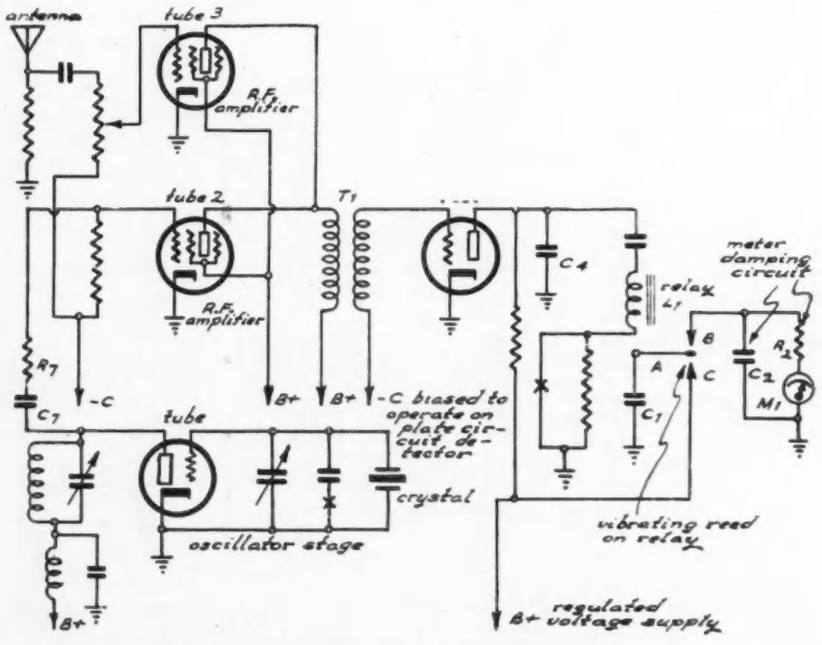


Fig. 135—Schematic circuit of a frequency monitor unit.

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**DEMAND**
is greater
than
**the Supply!**

★

**That's what's worrying YOU!**

★

Well!—
we can
supply the
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and
**Labor**
and help
**YOU**
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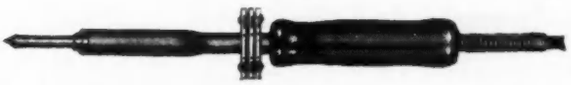

**DRAKE No. 400,** for example, is ideal for work in small places—weighs only 8 ounces and is only 9 inches long, yet it is a 60-watt iron.

**DRAKE No. 600-10,** is conservatively rated at 100 watts, but is only 10 inches long.

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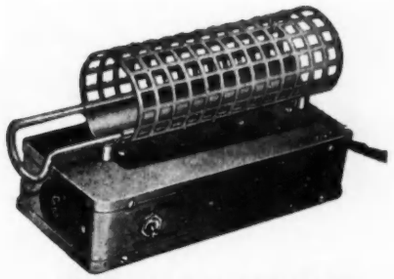

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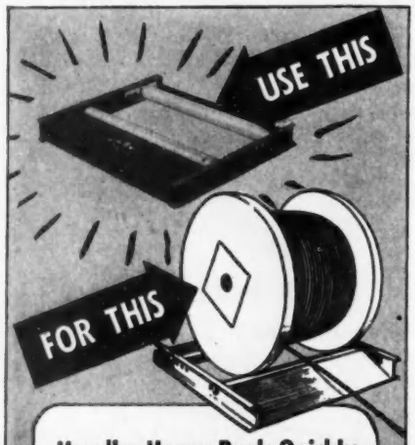


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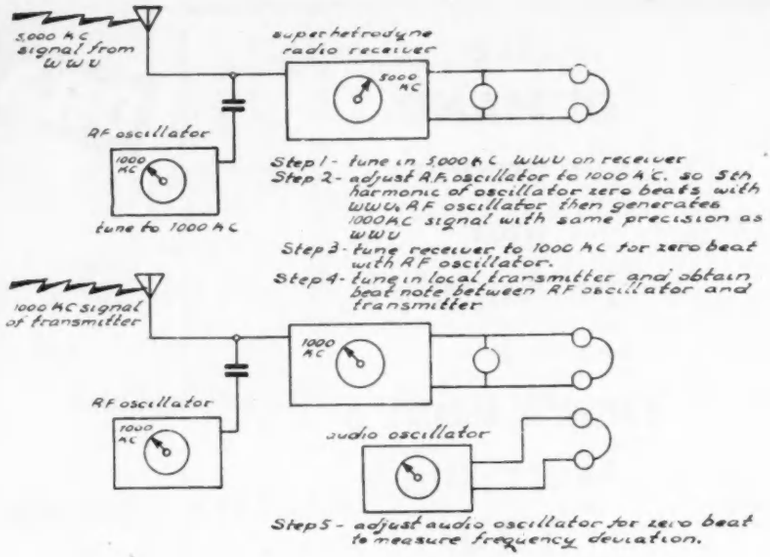
5000 KC signal from WWV
superhetrodyne radio receiver
5000 KC
RF oscillator
1000 KC
tune to 1000 KC
Step 1 - tune in 5000 K.C. WWV on receiver
Step 2 - adjust R.F. oscillator to 1000 K.C. so 5th harmonic of oscillator zero beats with WWV's R.F. oscillator then generates 1000 K.C. signal with same precision as WWV
Step 3 - tune receiver to 1000 KC for zero beat with R.F. oscillator.
Step 4 - tune in local transmitter and obtain beat note between R.F. oscillator and transmitter
1000 KC signal of transmitter
1000 KC
RF oscillator
1000 KC
audio oscillator
Step 5 - adjust audio oscillator for zero beat to measure frequency deviation.

**Fig. 136—Hetrodyne method of frequency measurement.**

the 50 cycle beat note flows through L1, the arm *A* vibrates alternately closing contacts *B* and *C*. When contact *C* is closed, capacitor *C1* charges. Now when the beat note in *L1* is such that contact *B* is closed, then condenser *C1* discharges through the d-c meter *M1*, producing a deflection.

It is readily apparent that the more rapidly the arm *A* vibrates the more times the condenser *C1* is discharged through the meter, hence the meter deflection is proportional to the frequency at which the arm *A* vibrates. Condensers *C2* and *R2* damp the meter and are so adjusted that the meter deflects steadily at low rates of vibration of the arm *A*.

For example, suppose the rate of vibration of arm *A* was only 4 cycles per second (assuming a difference of frequency between transmitter and frequency monitor of four cycles). If the meter were undamped, it would show four pulses or beats per second instead of a steady deflection. By the proper choice of C2 and R2, the discharge current of *C1* can be controlled so the meter shows a small steady deflection at low freqencies.

Thus it is evident that the magnitude of the deflection of meter *M1* is proportional to the rate of vibration of arm A, which in turn is proportional to the frequency difference between the transmitter and monitor oscillator, and consequently *M1* is calibrated in terms of *frequency deviation in cycles*. It should be noted that if the meter deflection *M1* is to maintain its accuracy of calibration, the voltage of the source must not vary, which necessitates a voltage regulator on the monitor power supply.

### *Frequency Measuring*

The frequency monitor affords a convenient means of checking transmitter frequency against a local independent frequency standard. However, for complete assurance that the station frequency is being maintained at the assigned frequency, the local standard must be checked at frequent intervals with a primary standard of frequency.

The United States Bureau of Standards maintains a schedule of standard frequency transmissions over station WWV. At regular intervals this station transmits at several frequencies, each carrier being accurate to one part in 5 million; i.e., the 5000 K.C. carrier is accurate to within 1 cycle. These frequency transmissions may be used to check the frequency of any broadcast transmitter by using the heterodyne method of comparing the frequencies.

The heterodyne method of frequency comparison can best be explained by illustrating examples of its use as shown in Fig. 136. Assume that the broadcast station is operating on a frequency of 1000 K. C., and we desire to check its frequency using the WWV standard transmission of 5000 K. C. The necessary equipment to make the comparison is: (1) a small variable radio frequency oscillator (whose output is rich in harmonics), covering the broadcast band, roughly calibrated so its frequency can be determined to the nearest 10 K.C. (2) a fairly sensitive radio receiver, preferably of the superheterodyne type equipped with a beat frequency to permit the reception of unmodulated signals and (3) an audio oscillator capable of measuring an audio tone from 0-5000 cycles with an accuracy of at least 1%.

**Toll Call Starting Time**
**and Elapsed Time are Both**
**Printed *Immediately* by**

# Calculagraphs

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**Dependability**

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### *Measuring Procedure*

The frequency measuring procedure is as follows: Tune in the 5000 K.C. standard signal of WWV on the receiver. Use the beat frequency oscillator of the receiver to enable tuning in the signal accurately, then shut off the code oscillator, maintaining the receiver tuned to the 5000 K.C. signal.

Next, set the local R.F. oscillator in operation at 1000 K.C., (as determined by the calibration dial of the R.F. oscillator). Couple the output of this oscillator loosely to the antenna coil of the receiver. Under this condition, the fifth harmonic of the local oscillator (5000 K. C.) will be picked up by the receiver, since it is tuned to 5000 K.C.

Slowly vary the tuning of the local oscillator about the 1000 K.C. point until the fifth harmonic produces zero beat in the receiver with the standard signal of WWV. When the condition of zero beat is obtained, the local oscillator is then generating a 1000 K.C. signal with the same precision as the standard signal of WWV.

Next tune in the 1000 K.C. signal of the local oscillator on the receiver and at the same time couple some of the 1000 K.C. signal of the broadcast transmitter into the receiver. A beat note will now be heard in the receiver which is the result of the 1000 K.C. oscillator and transmitter frequencies beating together. The pitch of this beat note can be compared with a signal of the audio oscillator to determine the frequency of the beat. The frequency of the radio oscillator then is a measure of the amount the 1000 K.C. transmitter is off from the assigned frequency. The direction of the deviation can readily be determined by slightly detuning the local oscillator. Thus when the frequency of the local oscillator is increased slightly, if the beat note increases in pitch, then the transmitter frequency is low. However, if the beat note decreases in pitch, then the transmitter frequency is high.

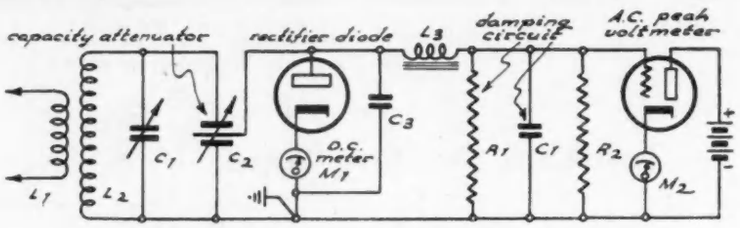



Fig. 137—Circuit of a modulation monitor.

### *Adjusting Transmitter to Desired Frequency*

The station operator, however, is usually more interested in having his station on the proper frequency rather than knowing the amount the frequency deviates. The station can be adjusted to the assigned frequency by using the standard transmission as a check. The procedure for this operation is almost identical with the frequency measuring procedure just outlined.

As before, the standard 5000 K.C. signal is tuned in on the receiver. Then the local oscillator is tuned to 1000 K.C. so its fifth harmonic produces zero beat with the standard signal. The local oscillator is then generating a 1000 K.C. signal with the same precision as the standard 5000 K.C. transmission. It is well to point out here that accuracy of the 1000 K.C. oscillator is determined by the precision with which zero beat is obtained.

After zero beat is obtained as well as possible by ear, added refinement can be obtained by turning on the code oscillator of the receiver. This imposes a 1000 cycle tone on the beat frequency and the intensity of the 1000 cycle tone waxes and wanes with the frequency of the beat. Adjust the local R. F. oscillator until the beat note is absolutely zero as indicated by a constant amplitude of the 1000 cycle tone.

Under this condition the local oscillator is generating a very precise 1000 K.C. signal. Tune in this signal and the R.F. wave of the transmitter simultaneously on the receiver. Adjust the tuning of the transmitter to obtain zero beat in the receiver. The broadcast transmitter is now adjusted to the assigned frequency of 1000 K.C. with the same degree of precision as the standard frequency of WWV. The only source of error in this method of adjustment lies in the fact that the frequency of the local R.F. oscillator might shift slightly between the time it is zero beat with WWV and the time it is zero beat with the transmitter. However, since the actual time required to make these adjustments is small, the use of a stable R.F. oscillator will reduce errors from this source to a negligible degree.

### *Modulation Monitor*

In the section dealing with modulation methods, it was pointed out that the greatest amount of power is radiated in the side bands when the carrier is modulated 100%. Since the amount of audio power developed in a radio receiver is dependent on the power in the side bands rather than the power in the carrier, it is to the advantage of every transmitter station to radiate a signal modulated as nearly 100% as is practicable. However, if the modulation exceeds 100%, severe distortion of the signal takes place, and in addition, interference on adjacent channels is produced.

The dynamic range of the program being transmitted also places restrictions on the percentage modulation of the signal which it is possible to obtain. If the audio signal being transmitted from a station were fixed as to maximum magnitude, the percentage of modulation could be adjusted once and for all, and no further attention given it. However, the intensity of the audio signal varies considerably during the progress of a program, depending upon such things as the intensity of the speaker's voice, the number and types of instruments used in a musical selection and the vigor with which the music is rendered. This variation of the *dynamic range* of a program requires that a constant check be made of the modulation percentage of the transmitted carrier.

It is the general practice in the broadcasting field to maintain at least 60%

"Yes, I killed two birds with one stone—combined the earmuffs with radio headphones."

(Courtesy RADIO-CRAFT)

modulation on signals of lowest intensity, since with percentages lower than this the distance covered by the transmitter fluctuates too greatly with signal intensity. Average modulation is maintained at approximately 85%, leaving a margin to take care of peaks in the sound program such as are encountered in crescendos of orchestral music.

### *Details of Modulation Monitor*

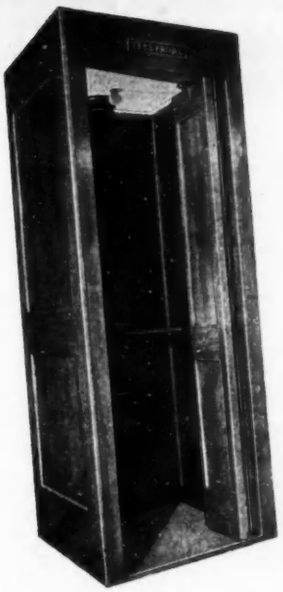
Basically, a modulation meter consists of a peak type vacuum tube voltmeter equipped with two meters which read a-c and d-c respectively. The modulated carrier is rectified and read on the d-c meter. The a-c voltmeter is used to measure the peak value of the modulated carrier, then the ratio of the a-c and d-c meter readings is a measure of the modulation. If the a-c and d-c meters read in the same units, the per cent of modulation can be obtained by the following formula:

$$M\% = \left( \sqrt{2} \times \frac{Eac}{Edc} \right) \times 100$$

It is obvious from the above equation that if some provisions were incorporated to maintain Edc constant, then the a-c meter can be calibrated to read the modulation directly in percentage. Referring to Fig. 137, the operation of this type of modulation meter can be explained as follows: Some of the R. F. carrier output of the transmitter power amplifier is coupled to *L1*. Coil *L2* is tuned by *C1* to the frequency of the carrier, hence a voltage proportional to carrier power is developed across this tuned circuit and is impressed across the plate and cathode of the first diode rectifier through the capacitance attenuator *C2*. This attenuator is adjusted until an unmodulated carrier produces a deflection of 100 on the d-c meter *M1*. When an unmodulated carrier is impressed on the circuit, no reading is obtained on the a-c peak voltmeter *M2* because of the filtering action of *L3*, *C3* and *R1*. When an unmodulated carrier is impressed on the circuit, the R. F. frequency is by-passed to cathode and prevented from reaching the grid tube number 2 by the inductance L3.

Now when a modulated carrier is impressed on the circuit, the deflection of meter *M1* remains practically unchanged, since the average value of the rectified carrier remains constant. Capacitor *C3* offers a high impedance to the audio component of the rectified carrier, and hence the audio modulating voltage is impressed on the vacuum tube voltmeter *M2*. This meter reads the peak value of the modulating voltage, and hence can be calibrated to read the modulation percentage directly. The meter is continuous reading and it is only necessary to maintain the reading of meter *M1* constant.


STROMBERG-CARLSON
RECOMMENDS—



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TELEPHONE BOOTH
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Automatic Electric Ventilator

Standard equipment on the CHURCHILL No. 100 Folding Door Telephone Booth is an automatic electric ventilator that keeps fresh air in the booth. An electric light makes reading or writing messages, telephone numbers, etc. easy. With such conveniences for your customers, watch your pay station business climb.

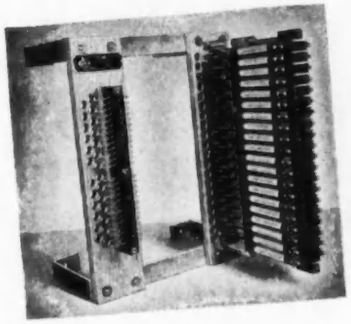
The CHURCHILL Booth is constructed as a single unit and equipped with a reinforced back panel for mounting a wall telephone or coin collector.

Made of selected white oak, available in light or medium oak in a satin finish.

Overall height is 84¾"; width, 29"; depth, 30½". Shipped knocked down and crated.

Illustrated literature available

THE COOK L9



WALL DISTRIBUTING FRAME

The Type L9 Wall Distributing Frame is intended for economical distribution and protection of limited capacity cable, and especially for installation in small exchanges. The L9 Wall Distributing Frame, made in 20, 40, 60, 80, and 100 pair sizes, is designed to carry any Cook central office protector. The frame of the L9 consists of two pieces of hard, kiln-dried maple—one drilled and arranged for, and equipped with, line terminals; the other drilled and milled for mounting the protectors; and two heavy mounting brackets of bar iron finished in durable paint.

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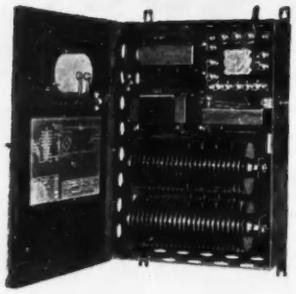
## Recommends...



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NO CREEPING
NO RUSTING

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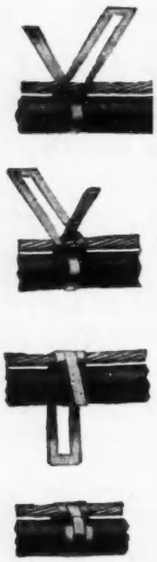

*The four simple steps above clearly illustrate the simplicity of a Reliable Zinc Cable installation.*

Even badly worn cables hung with Reliable Zinc Cable Hangers will last much longer. The reason is merely that all cable movement that results in wear and sheath cutting is eliminated, because the cable is rigidly bound to the messenger. This is also an added lightning protection—a solid ground is established between messenger and cable. Reliable Zinc Cable Hangers are strong, economical, and easy to install.

**Ask for complete information.**
***"RELIABLE" Identifies The Quality***

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The readings of meter *M2* should be almost instantaneous to check modulation on peaks of short duration (0.1 of a second or less). High peaks of speech and music are usually of short duration, and the mechanical inertia of the meter *M2* will not permit one to read peaks of short duration, yet these short peaks might be of sufficient intensity to overmodulate the transmitter. By the use of the damping circuit of *R2* and *C1*, *C1* charges up to the peak value and discharges through the high resistance *R2* thus causing the meter *M2* to "hang" momentarily on peaks to enable the operator to read the meter deflection.

(Part 1 of Chapter 11 will appear in the March 1 FORTNIGHTLY TELEPHONE ENGINEER.)

**Examination Questions Chapter 10—Standard AM Transmitter Circuits**

1—Why are temperature controlled ovens required for crystals used in commercial AM transmitters?

2—What is the principal purpose of the buffer amplifier used between the oscillator and succeeding stages of an AM transmitter?

3—What is the difference between the "shunt feed" and the "series feed" method of supplying d-c voltage to the plate inductance of an RF stage?

4—What is meant by a crystal having a "zero temperature coefficient"?

5—What is the basic purpose of the "interlocking relays used in conjunction with power supply systems of a large AM transmitter?

6—Explain briefly in general terms the operation of a thermostatic slow acting type relay.

7—What happens to high voltage rectifier tubes when the filament and plate voltage is applied at the same time?

8—What is the purpose of the station monitor?

9—Why is a frequency monitor system necessary?

10—What other method can be used to determine station frequency in place of direct frequency measuring equipment?

## Purchase Property

The Northwestern Bell Telephone Company was authorized last month to purchase two rural lines from Northern Township, Beltrami County, Minn.

Due to an overload on the rural lines of Northern Township, the sale to Northwestern Bell permits the removal of 17 multi-party service subscribers from their lines and would improve service for the remaining customers.

Rates now in effect for similar service provided from Northwestern Bell's Bemidji exchange are to be effective.

## S. E. Wright Heads Schauer Electrox Div.

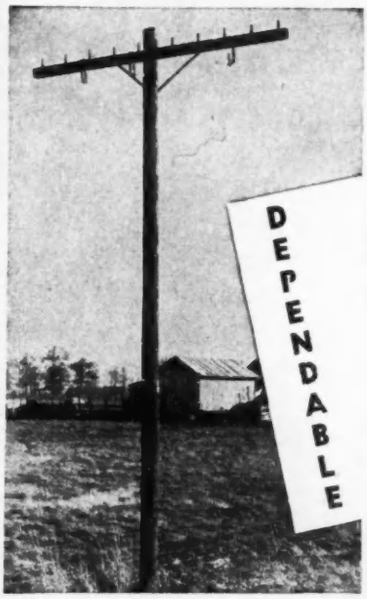
Stewart E. Wright, formerly of Cleveland, has become associated as general manager of sales with the Schauer Machine Co., Cincinnati, Ohio, according to announcement by A. J. Kohn, president of the company.

Mr. Wright, or "Stew" Wright, as he is familiarly known to thousands of telephone men throughout the country through his long association with the telephone industry, will be in charge of sales for both the Electrox and Machine Divisions of the Schauer Machine Company, with headquarters at the home office in Cincinnati.

S. E. Wright

The Electrox Division of the Schauer Machine Co. has for many years specialized in the development and manufacture of battery eliminators and battery chargers, especially designed to meet the needs of telephone men. The appointment of "Stew" Wright to head the Electrox Division, according to A. J. Kohn, is part of a projected program of bigger and better service to the telephone industry.


STROMBERG-CARLSON RECOMMENDS...

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For sturdy, well-seasoned cross-arms, specify "DEPENDABLE"

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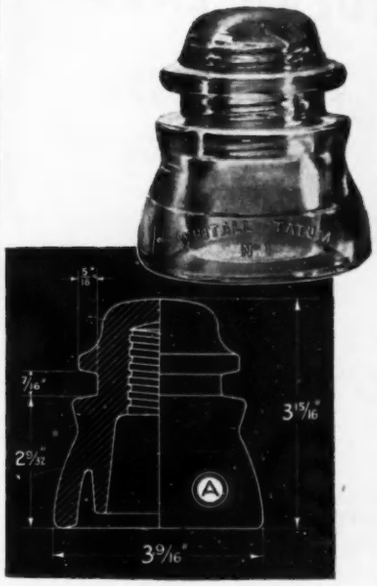


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Outstanding features of ARMSTRONG'S "Whitall Tatum" Glass Insulators are:
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- True pin fit—insured by careful, accurate gaging of pin-cavity.
- Durable—these insulators, both under test and in actual use, have proved stronger than supporting pins.

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**Nicopress**
**OFFSET DEAD ENDS**
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1. They are designed for use on copper, Copperweld and iron wire.
2. Simplicity and speed of installation.
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4. Provide for a tail of any desired length.
5. No extra tools are required to make the offset dead end as the same tool used in making regular line splices will do the job.

These convenient Nicopress Tools are small and compact and are extremely easy to operate close to the insulators or cross arms.

**"Eveready"**
**"Columbia"**
**"Gray Label"**

***The quality cell preferred by telephone engineers***

**Long Life Telephone DRY CELLS**

- **Higher sustained voltage.**
- **Longer life.**
- **Rock-bottom economy.**

These qualities, more important now than ever before, are assured through the constant supervision of America's largest dry battery laboratory.

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## Sell Property

The Rustad (Minn.) Rural Cooperative Telephone Association was authorized on January 16 by the Minnesota Railroad and Warehouse Commission to sell to Northwestern Bell Telephone Company all its telephone property in the vicinity of Rustad, as follows: 15.40 miles of pole line, 38.30 miles of galvanized steel wire, 17 miles of drop wires, 17 miles of inside wires, and 17 miles of protectors. Difficulties in maintenance and overload on the rural line caused the sale.

Rates now in effect for similar service from the Moorhead (Minn.) and Fargo (N.D.) exchanges, owned by Northwestern Bell, become effective upon completion of sale.

## New Representatives

The Stromberg-Carlson Company has added two new representatives to its nationwide telephone sales organization, reports T. C. Thompson, telephone sales manager of the 52-year old communications firm.

Robert H. Wallace

Robert H. Wallace will serve the company as traveling representative in the states of Idaho, Montana and parts of Oregon and Washington, and work out of the company's San Francisco, Cal. branch office.

John R. Hubbard will represent the company in Kentucky and parts of Tennessee and Indiana, working out of the company's Chicago office.

Mr. Wallace, of Spokane, Wash., had been a technician of the Interstate Telephone Company of Wenatchee, Wash., where he resides at present with his family. He is a past president of the Wenatchee Junior Chamber of Commerce.

John R. Hubbard

Mr. Hubbard, of Princess, Kentucky, and a graduate of the University of Kentucky in 1937 with a degree in electrical engineering, was employed in the engineering department of the Lexington Telephone Company of Lexington, Ky., before he rose to the position of plant engineer and construction supervisor in 1941. In 1942, he became a civilian telephone engineer in the Office of the Chief Signal Officer, Plant Engineering Agency. He is a member of the Triangle Fraternity and the Engineers' Club of Philadelphia, Pa.

## Reopen Service to Philippines

Radiotelephone service between the United States and the Philippine Islands, 7,000 miles across the Pacific, was restored January 28. American Telephone and Telegraph Company is operating the service in cooperation with the Philippine Long Distance Telephone Company. The service is available to both GI's and the general public, but initially it will be limited to Manila. The cost of a three-minute conversation between New York and Manila is $12.00 on weekdays and $9.00 on Sundays.

Because the Manila telephone system has only been partially restored, all calls from the United States must be placed at least 24 hours in advance. For those who wish to file calls to military personnel in Manila, it will be necssary to supply the name of the serviceman's unit, and his APO and serial numbers.

At the Philippine end, most conversations will be filed and completed at a single telephone center in Manila. However, some calls can be completed to commercial houses, hotels and other buildings in the Philippine capitol to which local service is available.


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GENUINE IRONITE DROP WIRE

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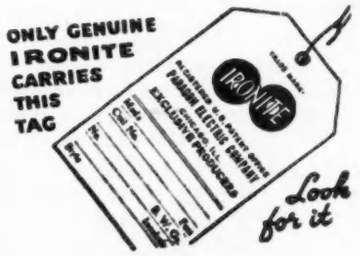


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Every pole bearing this mark is completely supervised from tree to consumer by men experienced in the industry.

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# LINE and DESK

Edited By
J. S. REED, JR.

**Q. What would you consider the best time to trim trees to obtain wire or cable clearance?**

**A.** The ideal time for trimming trees of course depends on the locality and the climate. Probably the best time is when the trees are bare of leaves since then the pruning can be done without disfiguring the trees, and is is also easier to obtain the necessary permission for this work from property owners. However, it is our opinion that where a service interruption occurs and it is impracticable to clear the trouble in any other way than trimming the trees causing the trouble, the pruning should be done at this time. For this purpose, many telephone companies provide maintenance cars and trucks with tree trimming tools to be used as required. Care should be taken in every case to secure the property owners' permission before proceeding with the trimming work.

**Q. When should drop wire be replaced with open wire extension or an open wire extension with cable?**

**A.** When more than three drop wires are involved in a long run or a run of one or more wires is over 500 feet long, it is considered cheaper to replace the drop wire with an open wire extension. In sparsely located areas where growth is slow and only one or two lines are involved, a bracket lead may be placed. In the case of open wire extensions carrying ten or more line conductors within town limits, it is cheaper from the standpoint of annual charges to place cables.

**Q. We have an ohmmeter with a maximum range of 50,000 ohms which is insufficient for certain of our tests. How would you increase the range to ten times this value, or 500,000 ohms?**

**A.** To increase the range of an ohmmeter you must first determine the resistance of the meter. The reading at the midpoint of the scale indicates the resistance of the meter plus the series resistance. For example, if your meter reads 1500 ohms at the midpoint of the scale, the resistance is 1500 ohms. Ten times this value is 15,000 ohms. The additional resistance required is 15,000-1500 or 13,500 ohms, At the same time the voltage of the series battery should be increased ten times. If it is 1½ volts, the required voltage for the new range should be 15 volts. A further increase in range to 5 megohms may be obtained by using a series resistor of 150,000-1500 or 148,500 ohms and a series battery of 150 volts. The same meter scale can be used in each case, the required value being obtained by multiplying the scale reading by 10 or 100 as required.

**Q. You recently described a method of determining the height of cable spans with measuring tape and rubber ball. Can you apply a similar method to measuring the height of drop wire spans above the ground? It seems to me that such measurements would be of considerable value especially where drop wire crosses a street or highway.**

**A.** The rubber ball and tape method should not be used to measure height of drop wire spans on account of the weight of the ball and tape which might cause the wire to sag to a greater extent and give a false indication of its true height. We suggest that you use a flat rubber or plastic bobbin shaped to enable a light but strong cord to be wound on it. The cord is knotted at distances corresponding to 8, 10, 14, 15, and 18 foot minimum clearances specified for the following situations:

| Location of Drop Wire Above | Minimum Required Clearance |
|---|---|
| Spaces or ways accessible to pedestrians | 8 ft |
| Roads or driveways in rural districts (paralleling) | 14 ft |
| Roads or driveways in rural districts (crossing) | 18 ft |
| Streets or alleys in urban districts (crossing or paralleling) | 18 ft |
| Alleys in urban districts (where permitted-crossing or paralleling) | 15 ft |

To measure the height of a drop wire span, stand off a little to one side of the span at its lowest point and after paying out sufficient cord to make throwing easy, toss the bobbin over the wire span. Pull on the cord until the bobbin is about to go over the wire and note whether the knot in the cord corresponding to the minimum required clearance for the particular situation reaches to the ground. If it does not quite touch the ground, the span height is satisfactory; otherwise the wire will have to be pulled to its proper height. A sharp pull on the cord will bring the bobbin back over the wire and allow it to fall to the ground.

## Exchanges Sold

The Breckenridge (Minn.) Telephone Company on January 29, was sold to the Western Telephone Company, and the Maple River (Minn.) Telephone Company, operating in Good Thunder and Beuford townships was sold to the Mankato (Minn.) Citizens Telephone Company. Both sales were approved by the Minnesota Railroad and Warehouse Commission.

## A. B. Chance Appoints Dwight Argo

The A. B. Chance Company, pole line construction and maintenance equipment manufacturer of Centralia, Missouri, announce the appointment of Dwight E. Argo as district sales manager in their southwest territory, covering the states of Texas, Louisiana, and Mississippi.

D. E. Argo

Mr. Argo began work with A. B. Chance in January, 1941, as a junior salesman in the Atlanta territory under W. A. Moss. During the war he was transferred to the company's home office to work as expediter and order coordinator. Before joining the A. B. Chance Company, Mr. Agro spent several years with the Alabama Power Company, working in Birmingham and Mobile.

Mr. Argo has made his headquarters at the Houston Engineers' Club, 2615 Fannin Street, Houston, Texas.

## Discontinue Toll Service

On January 22, the Northwestern Bell Telephone Company of Fargo, North Dakota was granted authority by its state public service commission to discontinue the public toll station at Spring Brook, N. D. The company expects to establish its own rural telephone service to the Spring Brook community at the same rural rates as other metallic rural service.


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*New* Drop Wire Built like a Tire Gives Greater Service

*Note these features*

**NEOPRENE OUTER JACKET** (tire tread type synthetic compound) greatly increases resistance to heat, cold, sunlight, and air filled with smoke and acid fumes.

**TOUGH BRAIDED TEXTILE FIBRE COVERING** over GR-S insulation (similar to tire construction) increases ruggedness 1600%, as shown by our shock-test.

**TELEPLATE CONDUCTOR COATING** provides adhesion equal to tensile strength of conductor; resists corrosion.

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THE WHITNEY BLAKE CO.
New Haven, Conn.
Well Built wires since 1899

## Sloan, Cook & Lowe Resume Engineering Practice

William F. Sloan and Maynard A. Cook have announced the resumption of their consulting engineering practice and the admission of Harry F. Lowe, formerly associated with them, as a partner in the firm which in the future will be known as Sloan, Cook & Lowe.

The business address remains the same—120 South La Salle Street, Chicago—although larger quarters, Suite 1344, are now being occupied.

Early in 1942 the present members of the firm suspended their engineering practice in order to engage individually in direct war work with the WPB and they later took prominent parts in the activities of the Office of War Utilities. Mr. Sloan resigned his position as Chief of the Equipment Production Section of the Communications Division at the end of 1944 and returned to private practice in Chicago at that time. His present partners, Mr. Cook and Mr. Lowe, remained with the office of War Utilities, the former as Deputy Director of the Communications Division and the latter as Chief of the Materials Control Branch, until that agency disbanded in September of 1945.

Maynard A. Cook

Harry F. Lowe

The firm now known as Sloan, Cook & Lowe was originally organized in 1913 by members of the engineering staff of the Wisconsin Railroad Commission. It has since carried on its engineering practice under various firm names, but under the continuous leadership of Mr. Sloan. Mr. Cook has been associated with the firm since 1914, and Mr. Lowe since 1924.

The firm has specialized in utility work for the past thirty-three years, and has made investigations and prepared reports covering cost of reproduction, original cost, determination of existing depreciation, property and depreciation accounting, economic surveys, technical engineering and management problems, and utility rate structures.

William F. Sloan

The firm has served cities, states and provincial governments and various utility companies in both the United States and Canada, as well as in the Hawaiian Islands.

Its activities have covered all types of utilities including telephone, electric, gas, water, and city transportation properties.

In restaffing its organization the firm has been fortunate in regaining the services of three former employees, E. Dean Clark, James H. Flower, and Ronald M. Gary.

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## Cut in Rates

The Commonwealth Telephone Company, Madison, Wisc., has been ordered to reduce its monthly rates 50 cents on individual business and two-party phones and 25 cents on residential services at Two Rivers, Wisc.

The Wisconsin Public Service Commission found the rates perviously charged by the telephone company at Two Rivers to be "excessive and unreasonable," and ordered a reduction to become effective with the February billing.

The commission said the order, on a temporary basis for one year because of unsettled economic conditions would effect a saving of $7,500 annually for Two Rivers subscribers.

The commission's ruling permits the company to return to the present rate schedule after a period of one year, pending the filing of a request for permanent reduction by the city.

The commission's order showed that the Commonwealth company on a basis of a $200,000 capitalization, had a net operating income of $19,396 in 1945—a 9.24 per cent return— which the commission termed "excessive." On the same basis, the net operating income will be cut to $15,535 in 1946—a 7.4 per cent return. This return will be "fair and reasonable," the public service commission believes.

A request for a reduction in local telephone rates was filed by the city in December, 1944.

In March, 1945, a public hearing was held, following which the 50 and 25 cent rate reduction was ordered to be effective with October billings. However, an appeal was granted the company and a hearing was held in Madison Nov. 8.

A one-party business line at Two Rivers costs $3.75 a month and a one-party residential line costs $2.58.

According to Walter Dakin, president of the Commonwealth Telephone Company at Madison, attorney for the company are now studying the commission's order and it is believed that the company will ask for a rehearing in the case.

## Accounting for "A" and "B" Companies Amended

The text of account 122, "Material and supplies," in the Uniform System of Accounts for Class "A" and "B" telephone companies has been revised by the FCC to provide for inclusion of amounts based on current prices new with respect to recovered material consisting of reusable minor items. The amendment was adopted on January 9 and will become effective August 1, 1946. The text of revised paragraph (d) (1) of account 122 is as follows:

"(1) Reusable material comprising items that, when installed or in service, were units of property or principal components of assemblies that were units of property, shall be included in this account at original cost (Note Sec. 31.01-3(x)), estimated if not known. (Note also Sec. 31.2-25(d).) Reusable material comprising minor items that, when installed or in service, were neither units of property nor principal components of assemblies that were units of property, shall be included in this account at current prices new. The cost of repairing reusable material shall be charged to the appropriate account in operating expenses."

## Acquires Property

The Ohio Standard Telephone Company of Jackson, O., has purchased the Morning Sun (Ohio) Telephone Company, formerly operated by L. H. Thomas and Earl Blose.

## USITA Engages Counsel

The Washington law firm of Case & Wozencraft has been engaged by the United States Independent Telephone Association to represent it in legal matters before the FCC and other government agencies whenever telephone interests of sufficient importance require legal counsel.

Clyde S. Bailey, executive vice president of USITA, reported in his member letter No. 131 that Mr. Case was a member of the FCC from 1934 to 1945; prior to that he was Lt. Governor and then Governor of Rhode Island and prior to that was U. S. Attorney in Rhode Island. Mr. Wozencraft during the war just ended, had the rank of colonel and served as communications secretary of the Joint Chiefs of Staff. Prior to that he was general counsel for the RCAC, and in the early 20's served as mayor of Dallas, Texas.


TRUCKS and TOOLS

for line construction and maintenance

Graybar supplies everything from pliers to completely equipped construction trucks. Peavies and pike poles — tapes, tree trimmers, tamping bars — shovels, hole spoons, loys, crowbars, climbers, wire cutters, splicing clamps, hoists, rope . . . these and all other tools your linemen need are obtainable via Graybar, through representatives with a specialized knowledge of telephone needs and standards.

On many standard items, delivery from our near-by warehouse saves time. Call our nearest office. *Graybar Electric Company, Graybar Building, New York 17, N. Y.*

4620

NEW FWD'S ADD SPEED AND SAFETY TO CONSTRUCTION AND MAINTENANCE

The derrick and power-driven winch on this new FWD unit speed the raising of telephone poles and afford added safety to the crew. Cab-over-engine construction gives a 5-man crew this full protection against the elements. It's one of the full FWD line available via Graybar.

via GraybaR

IN OVER 90 PRINCIPAL CITIES

## Simple Cord Test Sets

In a shop that handles removed telephones and telephone parts, it is desirable that the receiver and hand set cords be tested for continuity, short circuits, crosses and noise. A simple cord test set used by one large telephone company can be easily constructed and will give reliable results. It consists of three switchboard lamps, three push-button type keys, an induction coil and a telephone receiver. In operation the several conductors of the cord to be tested are placed under the spring clips which are connected to terminals 1, 2, 3, 4, 5, and 6 as shown in Fig. 1. Operation of each of the keys T, R and S will show whether or not a particular conductor is crossed, shorted or opened.

Noise will show up as a grinding, crackling sound in the receiver when the cord is moved and twisted.

Detection of faulty cords in the shop by this simple unit may save an expensive trouble call later.

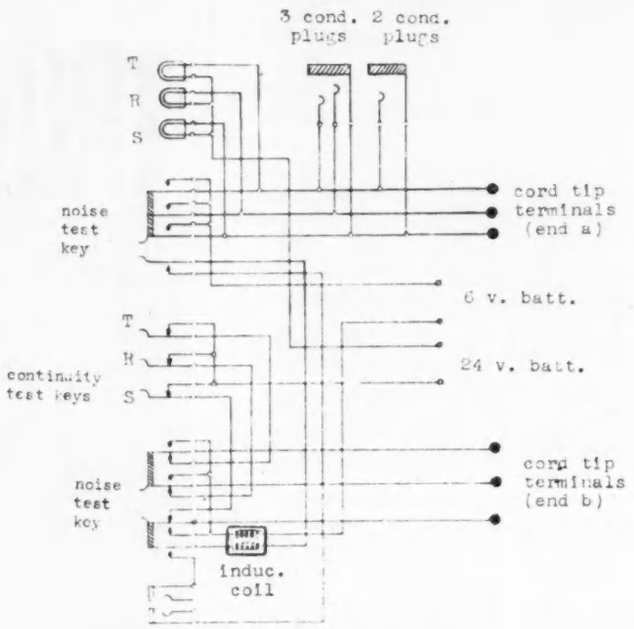



**Fig. 1 — Circuit of general purpose cord testing unit. Note—Continuity, crossed and shorted conductor tests are made with lamps and continuity test keys. Noise tests are made by listening in receiver with the two noise keys in the operated position. The cord conductors should be moved and twisted when making noise tests.**

## Roy Augustine Back from Europe

Roy Augustine has returned to his post as telephone switchboard division engineer for Kellogg Switchboard and Supply Company, Chicago, following a leave of absence for special government service.

Mr. Augustine was "borrowed" by the Foreign Economic Administration last August and sent to Europe as colonel of a special military mission.,

During his service in Europe he covered 22,000 miles in jeeps, command cars and airplanes. Most of his work was in Germany where he surveyed communications equipment. Some of the information he obtained was presented as technical evidence in the Weisbaden and Nuremburg trials.

Roy Augustine

## Service Complaint

Subscribers of the Northwestern Minnesota Telephone Company's exchange at Karlstad, Minn., recently signed a petition complaining of very poor service as follows:

1. Lines are not in shape nor telephones serviced sufficiently to render proper service.
2. Switchboard is too small for volume of business.
3. Operators not on 24-hour service.
4. Telephones are often out of order; connections are poor with crosstalk and other interference.

The Minnesota Railroad and Warehouse Commission on January 10, ordered the Northwestern Minnesota Telephone Company at Karlstad to grant relief demanded in the above complaint or show why relief should not be granted.

## Iowa Association Has New Secy.-Treas.

William F. Miller is the new secretary and treasurer of the Iowa Independent Telephone Association. "Bill" Miller has been in the Independent telephone field for thirteen years, having started in the engineering department of the Pennsylvania Telephone Corp., Erie, Pa. in 1929.

Mr. Miller entered the commerical field in 1932 for the same company and was later made district manager of the Sayre district. In 1936 he joined

W. F. Miller

the staff of the Iowa State Telephone Company at Newton, Iowa as commercial superintendent and later became the connecting company agent for the Iowa State company.

In 1942 he accepted a commission in the Signal Corps and went overseas a few months later. His tour of foreign service was made up of 13 months in India, a short time in Burma and over a year in China. Mr. Miller attained the rank of Major in 1945 and was the Signal Supply Officer for the China Theater of Operations. He returned to the United States in December 1945. His duties as secretary-treasurer of the Iowa Association began February 1.

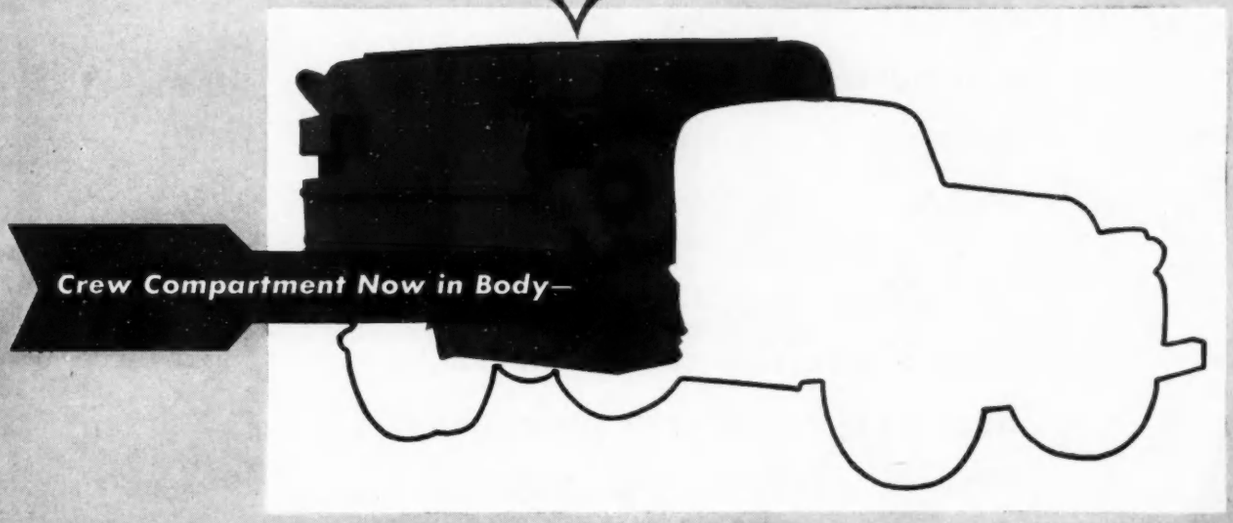
# 2 IMPORTANT BENEFITS in the RE-DESIGNED *American B 4*

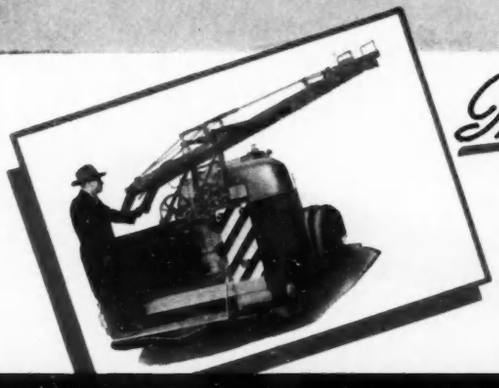
**1** You gain two important benefits with the re-designed American B4, the famous all-around utility truck with the many exclusive American features.

The crew has much more room, a full 39" of width, complete visibility, good ventilation and all-around, safe comfort. They arrive on the job ready to go to work.

**2** Here's the important dollar story. The crew-in-the-body removes the cab from the special to the standard class. This means ready resale on the open market. An important factor when you consider American bodies outlast a chassis at least 2 to 1 and many times 3 to 1. Now your B4 is more valuable than ever before.

*Get the complete profit story on the American B4 in Bulletin B-4, mailed promptly on request, or ask us about it on your next visit to the big modern American factory in Cleveland, Ohio.*



## *Improved* AMERICAN REVOLVING AERIAL LADDER

New method of counter-balancing makes this ladder so easy to manipulate, a child can do it. Regardless of angle, you can place in position with one hand. 40 spotting positions instead of 20. Turn complete circle in as narrow a body as 46". New type lock assures complete safety at all times.

Available in 3 sizes for any make of chassis . . . when fully extended, platform height to ground is 23' 6" . . . 26' 6" . . . 30' 6". *Saves time and money. Write for details.*

**The AMERICAN COACH & BODY COMPANY**
9503 Woodland Ave. CLEVELAND. OHIO

ACB and

# POINTING TO THE FUTURE

Our advertising program endeavors to interpret the telephone industry to all ages – youngsters as well as adults.

The advertisement on the opposite page is one of a series currently appearing in juvenile magazines. This one tells boys and girls about the new mobile radiotelephone development in language they understand.

AN ADVERTISEMENT OF THE

BELL TELEPHONE SYSTEM

# "Right! We'll pick it up on our way in"

THE day is coming when automobiles and trucks will be *telephones on wheels.* In touch with their offices by the telephone on the dashboard, delivery-truck drivers will be able to take care of last-minute orders without making extra trips.

Callers from cars will talk over two-way radiotelephones that will be linked with the land lines of the telephone company through the nearest of several receiving and sending stations.

It is similar to the Bell System's ship-to-shore radiotelephone service used widely in coastal, harbor and inland waters before the war.

Installations of this new mobile radiotelephone service in a number of large cities will depend upon how rapidly production of new radio equipment can get going.

BELL TELEPHONE SYSTEM

# Minnesota Convention

(Continued from page 33)

A group of visitors at the Minnesota convention viewing the initial showing of the new Stromberg-Carlson XY switch.

M. F. Wickman, engineer, Northwestern Bell Telephone Co., delivered a paper Reconstruction and Reconversion—The Importance of plant Engineering in Contemplating Reconstruction and Reconversion."

Mr. Crowley, at the end of each paper, called for questions from the floor and in many cases related actual incidences among Minnesota telephone people how the speakers could be of much assistance by answering questions from the floor.

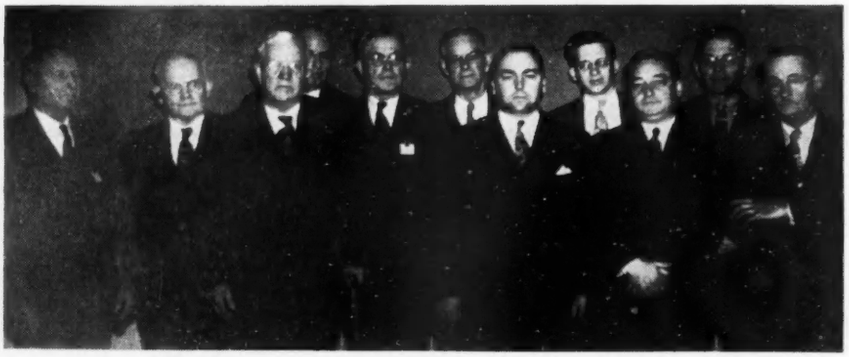
Eldon Eckles lead discussion by presentation of a prepared paper on "Cable Planning, Maintenance and Repairs." His subject brought many questions from the floor in true open forum style.

"Rural Pole Line Construction—Types and Methods" had P. M. Ferguson, H. E. Clayton and Vies Martinsen as the experts with each of them outlining their experiences on the subject. Many questions were propounded and answered during this discussion which followed presentation of statistics by the three leaders.

"Experiences with Mechanical Hole Diggers" was lead by C. F. Angell, Geo. Heck and Mr. Clay. Both Mr. Heck and Mr. Angell outlined many additional uses for the digger other than pole holes.

The closing feature of the open forum session was handled by Daniel McNulty, manager, Telephone Repair & Supply Co., Chicago, on "Maintenance and Inspection." This speaker outlined many ideas on the subject assigned and the entire floor propounded questions until the meeting was adjourned.

Mr. Crowley and the officers of the Minnesota Telephone Association are to be congratulated on the outstanding convention presented. Your reporter believes it one of the most instructive and entertaining we have ever attended.



Officers and directors attending directors' luncheon of Minnesota Telephone Association.

## Helpful Book for FCC Exam

When radio channels are used in telephone plant, a licensed operator will have to be available to make adjustments on the equipment.

This license can only be obtained by passing a technical examination at one of the FCC district offices in various cities throughout the country. The examination questions given embrace electrical and radio theory radio transmitting and receiving circuits and radio laws and regulations.

If you are interested in radio applications in the telephone field and wish to prepare for its future use in your industry, a valuable book would be "Radio Operating Questions & Answers" by Nilson and Hornung. It is a standard text used by thousands of operators in preparing for their first or second class radio telephone licenses.

If your company is now planning on using radio channels and you wish to prepare your men to pass the FCC examination, "Radio Operating Questions & Answers" may be obtained through the Telephone Engineer Book Corporation, 7720 Sheridan Road, Chicago, Illinois at $3.00.

## Rate Increase

The Danielsville and Comer Telephone Company of Georgia, with authority from its state public service commission has increased its rates for its exchanges in Carlton, Colbert, Comer, Danielsville and Ila, Georgia, as follows:

| Class of Service | Old Rate | New Rate |
|---|---|---|
| Business individual line | $2.50 | $3.00 |
| Business party line | 2.00 | 2.50 |
| Residence individual line | 1.50 | 2.00 |
| Residence party line | 1.25 | 1.50 |

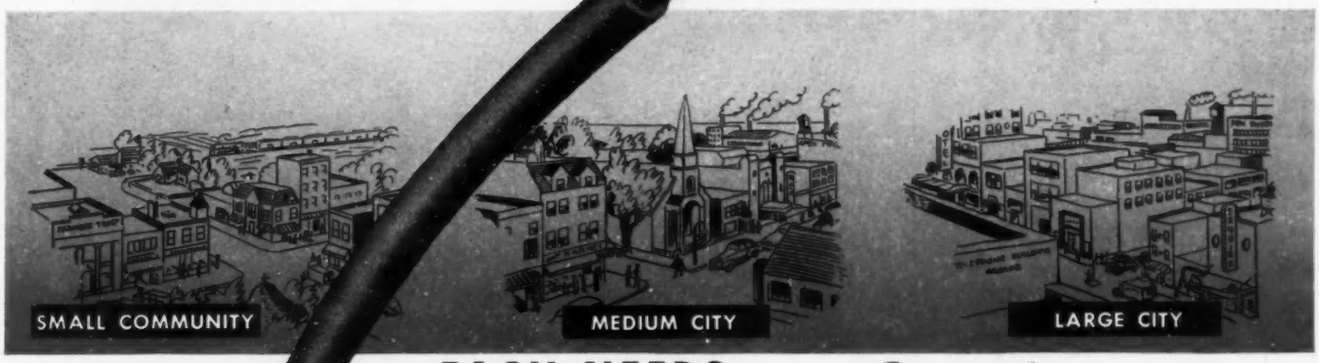
The company showed cause that it had been operating at a loss for four years and needed added revenue to rehabilitate its plant.

## Kellogg Facilitates Surplus Disposal

Kellogg Switchboard and Supply Company, Chicago, acting as general agent for the Reconstruction Finance Corporation, has opened a special branch office in San Antonio, Tex., to facilitate the sale of surplus communications material for the government.

More than $1,250,000 worth of communications equipment has been turned over to the Kellogg surplus material division for disposal. According to J. M. Nolan, manager of the division, there is a brisk demand for this type of equipment.

**WHATEVER THE CABLE NEEDS OF EACH . . .**




**. . . EACH NEEDS**

# *The Right Cable Installed Right*

**Kellogg's Outside Plant Engineering Service Covers These Vital Points . . .**

- Scientifically analyzing your community in relation to outside plant requirements to determine the practicability of open wire, aerial cable and underground cable.
- Laying out cable plants to assure adequate sizes and flexibility of cable pairs and to provide the most economical means to handle expansion.
- Rearranging cable and cable pairs to permit extensions and additions without the loss of existing plant.
- Analyzing right-of-way to determine the best routing at lowest practical cost.
- Recommending the most economical construction methods and equipment.
- Specifying proper and adequate termination and protection equipment.
- Providing for additions or replacements without disturbing main cable splices.
- Observing electrical codes in locating cable so as to guard against power line hazards.
- Assuring cable plants of maximum transmission efficiency.
- Reducing your present maintenance expense of outside plant.

*These are just a few of the many important considerations involved in engineering a sound, efficient cable system. For full details, check with Kellogg's Outside Plant Engineering Service.*

Yes—whatever the size of the communities your company serves—whatever your present or future plans for telephone cable—capitalize *fully* on your investment by following this simple formula: "the *right* cable installed *right*."

Depend on it, the "right" cable will be ROEBLING cable. For that you have the word of practical telephone men in all parts of the country, who know its ability to meet the tough assignments of the telephone industry. For that you have the century-old ROEBLING record of dependability, and the company's reputation as a manufacturer of high-performance cable made to exacting specifications.

And as for "right" installation—for the sound engineering that will assure low first cost, lower maintenance expense and maximum service to subscribers—look to Kellogg. This company's Outside Plant Engineering Service is highly qualified to help you lay out the exact cable system your company needs, whether it's a small job or large, whether it's new construction or extension or replacement of existing cable. Get in touch with Kellogg now on your cable problems.

**JOHN A. ROEBLING'S SONS COMPANY**
**TRENTON 2, NEW JERSEY**

**ROEBLING**

JAR ROEBLING **TELEPHONE CABLE**

SINCE 1897 KELLOGG

*Distributed by* **KELLOGG**
**SWITCHBOARD & SUPPLY CO.**
6650 South Cicero Avenue, Chicago 38, Illinois

AVAILABLE NOW

PARAGON TREE WIRE

EXTRA HEAVY WEATHERPROOF

Special tree wire—Heavy rubber insulation with 2 ply cotton braid thoroughly impregnated. Outside braid is Seine twine cable cord. Core is Crapo galvanized BB telephone wire. Paragon tree wire gives triple life of ordinary weatherproof wire. And it is available now at $19.20 a thousand.

SUTTLE EQUIPMENT COMPANY
LAWRENCEVILLE, ILLINOIS

ALL the strength and durability inherent in steel are combined---with definite economies---in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

## Construction Begun

Construction work on the new $35,000 Platteville (Wisc.) Telephone Company building started early in January and, it is expected, will be completed, weather permitting, in late March or early April.

The building is to be 45 feet by 54 feet, one story, white, and, according to the contractors, will be built of architectural concrete, and will be fireproof and modern in every way.

J. W. Edge, Platteville, is president of the telephone company, and O. W. Aiken is manager.

## New Exposure Slide

A simple exposure slide enabling the operator of a photocopying machine to calculate in an instant the proper exposure time for anything he wants to copy has been developed for the first time, by the American Photocopy Equipment Company, Chicago, makers of photo-copyers used in offices and plants.

Even though the photocopying units are already easily handled by unskilled office help, the new device serves an important function: its instantaneous calculation of exposure time brings added speed to the photocopying operation.

The slide, which is now being distributed to owners of Apeco Photocopy equipment, is made of high quality varnished cardboard, measures approximately six inches long and three wide, and holds a movable chart whose figures appear through slots on the front face of the rule. Exposure time is given for five types of reproduction: positive; and reflex, reverse, alternate and readable negative.

These exposures apply to documents ranging all the way from original tracings on very thin paper to newspapers, photographs and blueprints, etc.

## G. K. Beare Returns to Automatic Electric

W. J. Caverley, president of Automatic Electric Company, announces that Gene K. Beare, recently released from active service with the United States Navy, has been appointed executive assistant to the president.

Mr. Beare entered the employ of Automatic Electric Company in June, 1939. After working for a time on special assignments for the president's office, he was appointed assistant to the sales manager, and later as assistant to the general manager.

Commissioned as ensign in the United States Naval Reserve in June, 1942, Mr. Beare was assigned to the Bureau of Ships at Washington, shortly afterwards

Gene K. Beare

returning to Chicago where he dealt with design, procurement and construction in connection with the extensive program of shipbuilding in the middle west, which included the production of various types of landing craft, subchasers, mine sweepers and tugs. In June of last year, he was reassigned to the supervisor of shipbuilding at Los Angeles in connection with west coast landing craft construction, and was released to inactive status on December first.

## New Hoist

The A. B. Chance Company of Centralia, Mo., announces the development of a new "Tips Tugger" hoist for tightening guy wires, hoisting transformers, and for a number of pulling, lifting and lowering jobs. These new Tuggers will have a die cast aluminum body and handle for much lighter weight than any developed previously. The new model weighs only thirteen pounds but will lift a three-quarter ton load with a sixty pound pull on the ratchet lever.

This new hoist has close control of take up and is consequently very accurate in spotting loads. The chain is a high strength, Herc-Alloy link type which will not kink, bind, or become disconnected. The tugger has oil impregnated, porous bronze bushings in all rotating points, insuring smooth operation, maximum efficiency and long life. No lubrication is necessary.

The manufacturer says this new Tugger was especially designed for Utility operation. It is light weight, making it more easily handled on poles, towers, substations, etc.

## To Reduce Rural Construction Charges

The Michigan Bell Telephone Company has made a proposal to the State Public Service Commission which would enable 10% more farm families in its territory to obtain telephone service with no construction charges.

Following a report of the Michigan Rural Communications Committee, headed by Clark L. Brody, executive secretary of the Michigan State Farm Bureau, Michigan Bell filed a petition with the state commission which would increase from 3/10 to ½ mile the amount of construction to be furnished free of charge by the company. Theodore H. Dawson, head of the company's rural program said the plan was part of a rural project which in the next five years will cost $13,500,000 and will be a major item in the company's 120,000,000 postwar expansion program.

The plan is a modification of Michigan Bell's 1940 rural construction plan which set up an installment basis whereby construction charges could be paid monthly over a five-year period. Under the modification no construction charge would be made for installations if the number of applicants per extension averages one per half-mile. It was also stated that although the rate per tenth mile in excess of the initial allowance would remain at $27 the cost could be prorated among those served by the extension and charged for at a rate of 45 cents a month per 1/10 mile and as customers would be added to the line the monthly charge for construction would be recalculated to reduce cost per customer or eliminate it entirely.

In addition to installation of more rural lines and replacement of manual units with dial equipment, Mr. Dawson promised rural customers rubber-covered wire buried by a special plow—2,800 miles of which are already in use in Michigan—a high-strength steel wire permitting longer spans and small dial switching units used to serve groups of farm families. Since 1940, Michigan Bell has built 1,100 miles of rural line, serving 4,800 families and installed service for approximately 30,000 additional farm customers.

## Graybar Appoints B. R. Cole

Effective January 15, Burton R. Cole took over the duties of communications sales manager for the Graybar Electric Compay at executive headquarters in the Graybar Building, New York City, according to an announcement by company president, A. H. Nicoll.

Burton R. Cole

Prior to a tour of duty with the U.S. Army Signal Corps from 1942 to 1945, Mr. Cole was manager of the lamp, lighting and supply departments in the Seattle territory.


**Test-O-Lite**

*TESTS ANY VOLTAGE... 100 to 550 Volts, A.C. or D.C. Safely, Swiftly, Surely*

THE NEON GLOW LOCATES TROUBLE INSTANTLY

Indicates hot or grounded wires. Tells AC from DC. Far superior to ordinary clumsy test bulb. Indispensable in shop or home. The only pocket-size tester with PATENTED SAFETY FEATURE.

Life-time guarantee. List $1.50. Purchase thru electrical dealers. Pat. No. 1,778,883.

**RTC-2 VINCENT RARE GAS RELAY**

for harmonic or coded bells. Dual purpose device which economically improves both ringing and transmission on party lines. NO MOVING PARTS. Fully guaranteed. Can be installed in a minute.

L. S. BRACH Mfg. Corp.
200 Central Avenue Newark, N. J.

**ACORN INSULATED WIRE**

**TODAY TELEPHONE WIRE has to be tough**

Many years of specialization in the manufacture of communication wire has built a performance record for Acorn Drop Wire.

ACORN INSULATED WIRE COMPANY, INC.
225 King Street, Brooklyn, N. Y.
LEICH SALES CORP., 427 W. Randolph St., Chicago
LINDSAY SUPPLY CO., 4815 Superior Ave., Cleveland

ACORN'S exclusive Carton packaging preserves carefully developed QUALITY until installed . . .

Drop Wire — Bridle — Interior — Tree — Ground — Switchboard — Pothead — Cable Terminal — Instrument — Fixture — Buried Wire

## Request Rate Increase

An application has been filed with the Minnesota Railroad and Warehouse Commission by the McLeod County Telephone Company, Glencoe, Minn. to increase rates at its Buffalo Lake exchange. Hearing will take place February 27.

| Class of Service | Present Gross Rates | Proposed Gross Rates |
|---|---|---|
| Individual line business | $2.75 | $3.25 |
| Two-party line business | | 3.00 |
| Individual line residence | 1.75 | 2.00 |
| Four-party line residence | | 1.75 |
| Rural multi-party residence | 2.00 | 2.25 |
| Extension gongs | | .25 net |

## Order Overhauling

The Belmont-Pleasant View Telephone Company, Belmont, Wisconsin, has been ordered by the Public Service Commission to overhaul its lines. Complaints by 96 telephone users in the Belmont vicinity led to the order. Unsatisfactory and noisy service and the long time required for repairs were the factors protested against by subscribers.

The commission instructed the company to spend $5,000 for general maintenance and $5,000 to replace wires and poles, and to report on progress of the rehabilitation by next July 15.

## Eugene T. Scott With Templeton, Kenly & Co.

Following his release from the Naval Air Force, Eugene T. Scott has joined Templeton, Kenly & Co., Chicago, manufacturers of Simplex industrial jacks, as product application engineer with headquarters in Chicago. Scott will cover a large portion of the United States in his work at sales and applications.

E. T. Scott

After leaving Northwestern University in 1935, "Gene" Scott was field manager for the National Aluminate Co. of Chicago, until 1940, and in personnel work for the Chicago Screw Co. to 1942, when he enlisted in the Navy. He served as a Naval aviator and lieutenant for three and a half years, and at the time of his release was serving as Squadron Commander of a training squadron.

## Marine Corps Commends Automatic Electric Sales

Automatic Electric Sales Corporation, domestic distributors for Automatic Electric Company, has been awarded a "Special Commendation" in recognition of "unselfish and tireless efforts in fulfillment of the requirements of the United States Marine Corps."

In a letter accompanying the certificate, Colonel G. L. Gloeckner, Depot Quartermaster, reviewed the unbroken series of Marine Corps victories during the war from Guadalcanal to Okinawa, and acknowledged the cooperation and aid received in the attainment of those victories.

Automatic Electric manufactured and supplied large quantities of telephone and other communication equipment both for Marine Corps depots and for use in campaign operations.


Get 60-SECOND Splices

The NICOPRESS Way

1. CLEAN ends of wire . . . . . .
2. INSERT wire in sleeve . . . . . .
3. COMPRESS with Nicopress Tool . . . . .

Order Your Nicopress Tools and Sleeves of

AUTOMATIC ELECTRIC
SALES CORPORATION

1033 WEST VAN BUREN STREET, CHICAGO 7, ILL.

Send in your problems on Construction and Maintenance

**Yes! . . . Send us your problems on Construction and Maintenance . . . and we will endeavor to answer them along with dozens of others that have been submitted to our editorial staff in the big—**

# SPRING CONSTRUCTION and MAINTENANCE issue of

## TELEPHONE ENGINEER and MANAGEMENT

### April 15, 1946

This annual feature number will be jam-packed with timely and valuable information on construction, replacements, repairs, new products, new ideas, etc.

Special articles will be profusely illustrated . . . Line and Desk pages will present answers to many stubborn problems sent in by our readers.

All of this . . . plus . . . the usual editorial features that have caused TELEPHONE ENGINEER and MANAGEMENT to have more **paid** subscribers among managers, engineers and maintenance men than any other telephone trade journal.

**Manufacturers and suppliers serving construction and maintenance materials will, as usual, devote their advertising space to such products.**

*Watch for the* **SPRING CONSTRUCTION and MAINTENANCE**

**issue of TELEPHONE ENGINEER and MANAGEMENT---April 15, 1946**

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*with* REVERSIBLE
"SAFETY POINT"

CHANCE *Pike Poles have these Extra features:*

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- Point can be reversed and inserted into ferrule. No sharp projection.
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- Spiral tip holds without slipping.
- Choice fir poles, lacquer finished, with reinforced butt.

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INDUSTRIAL STEEL

A·B·CHANCE CO· CENTRALIA MISSOURI

# Telephone Engineers Enlightened at Radio Convention

(Continued from page 30)

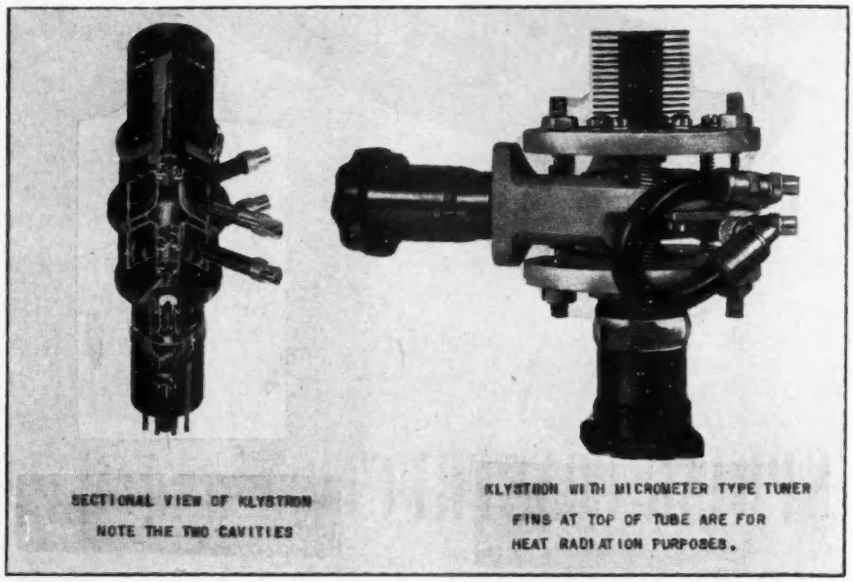

SECTIONAL VIEW OF KLYSTRON
NOTE THE TWO CAVITIES
KLYSTRON WITH MICROMETER TYPE TUNER
FINS AT TOP OF TUBE ARE FOR
HEAT RADIATION PURPOSES.

**Fig. 6—Details of Klystron tubes (Courtesy Sperry Gyroscope Company).**

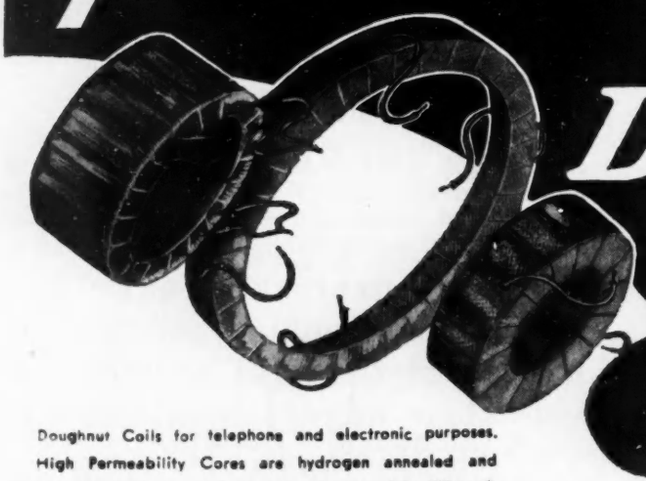
*Copyright 1945 by Sperry Gyroscope Co.*

microwave "plumbing" so glibly discussed by radio men at the IRE meeting. This paper discussed the use of metal wave guides and showed that at microwave frequencies such units are preferable to the ordinary two path wire or coaxial circuits. It was shown that connectors, rotating joints, tee junctions, transformers, filters, attenuators, etc. can all be made in wave guide form.

The author insisted that in many respects the wave guide circuits are simpler than wire counterparts. But in spite of this consoling thought there are still many telephone (also radio) men that find it difficult to pick up a piece of silver plated copper tubing that looks like a section of rectangular down spout and not feel that they were born at least 50 years too soon.

*Effect of Rain on the Propagation of the Very Short Waves*—Telephone men interested in the possibilities of the super high frequencies for short and long haul toll purposes listened intently to a paper which described the effect of rain on the very short waves. It was stated by the author that light and moderate rain offers only slight attenuation for 3.2 centimeter waves, but that during a cloudburst the attenuation may be as high as 5.0 db per mile. At still shorter waves the attenuation is even higher and may be as much as 42 db per mile during a cloudburst.

*Toroids..* by DX



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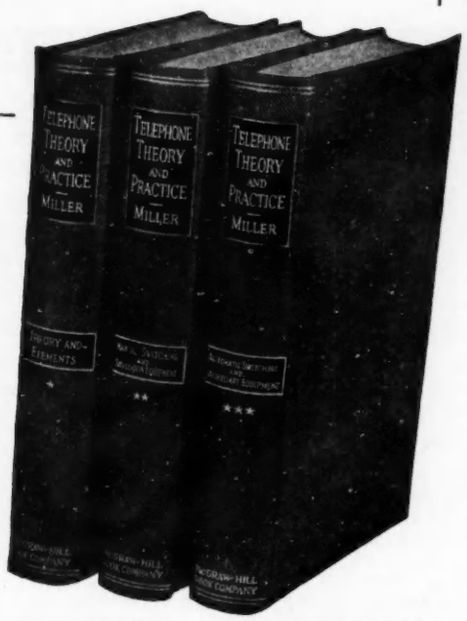


Features of these books are the clear, understandable treatment; the simple language employed; and the profuse illustrations with drawings and photographs of actual apparatus and circuit diagrams.

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by KEMPSTER B. MILLER, Consulting Engineer

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**VOLUME 3**

## Automatic Switching & Auxiliary Equipment

***494 pages, 6x9, 287 illustrations, $5.00***

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**High resistance to corrosion**
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**Longer spans and fewer poles**
**Increased transmission efficiency**

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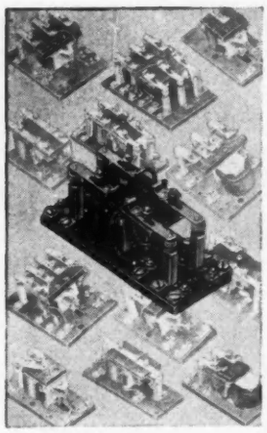

**BULLETIN 130 RELAYS**

The Bulletin 130 relays offer the user the choice of one to four poles, 6 to 230 volts D.C. and 6 to 440 volts A.C. in single or double throw, normally open or closed, with or without blowout coils and a host of other options. With such flexibility of arrangement, custom requirements can be met without prohibitive cost or undue delay in delivery.

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# Telephone Engineer

## HANDBOOK TABLES

**Index—Pole Line Design**
**Date—February 15, 1946**

### Symbols in Exchange Plant Records—Poles and Pole Hardware.

TO identify poles and pole hardware on city and rural plant maps, standard symbols are suggested to represent these items. Variations of these symbols are also used to indicate additions, removals, or retention of pole items as shown in the following tables.

### *Table No. 1*—Symbols Representing Pole Hardware and Wire on Exchange Plant Maps.

| Symbol | Explanation |
|---|---|
| Pl. | Place-over plant to be placed |
| Rm. | Remove-over plant to be removed |
| 2-C | Number of copper toll wires |
| 2-IT | Number of iron toll wires |
| 2-ITk | Number of iron trunk wires |
| 2-I | Number of iron exchange or rural wires |
| HP | "H" fixture pole |
| GP | Guy stub pole |
| PB | Push brace pole |
| B | Single pole bracket |
| DB | Double pole bracket |
| A | Single crossarm |
| DA | Double crossarm |
| BB | Back brace |
| GA | Guard arm |

### *Table No. 2*—Symbols Representing Poles on Exchange Plant Maps.

| Symbol | Explanation |
|---|---|
| ○ | Present telephone pole |
| ●25'-4 | Proposed telephone pole (Indicating height and class) |
| ⊠ | Telephone pole to be removed |
| M | Municipal pole |
| P | Power company pole |
| ○P | Telephone pole with power co. attachment |
| ×M | Municipal pole with telephone attachment |
| Ⓟ | Joint pole, telephone and power co. |
| Ⓜ | Proposed joint pole, telephone co. and municipal |
| P Am 1-0 | Telephone attachment to be placed on power co. pole. |
| × Am 2-0 | Telephone attachment to be removed from municipal pole |
| L | Local or foreign telephone co. pole |
| ○St. | Straighten pole |
| ○Mv. | Move pole |
| ○L.B. | Lower butt |
| ○L.R. | Lower arm |
| ○S.D. | Set deeper |
| ○Rk. | Rake pole |
| ⊢ | Present patent anchor |
| ⊢6" | Proposed patent anchor (Indicating size) |
| ⊢× | Patent anchor to be abandoned |

# Our Washington Bureau Reports

(Continued from page 37)

At the same time, another state commission, the Illinois Commerce Commission, has filed a statement of position with the FCC on telephone recording devices. The Illinois Commission expressed neither favor nor opposition of the use of recording devices but urged that the FCC should not enter any order which would "impair or restrict, directly or indirectly, the power of the state commission to regulate, and to prescribe rules and regulations for, the furnishing of telephone services." The Illinois Commission called attention to the fact that 98.7% of all telephone messages are intrastate and approximately 95.1% are local exchange messages and stressed to the FCC that in view of this fact it would be difficult in practice to make a different rule with respect to the use of recording devices for interstate than for intrastate service.

### *German Communications Developments*

Answering questions on progress of electronics in Germany up to the time of her defeat as well as solving some problems for American manufacturers and operators, the Technical Industrial Branch of the Joint Intelligence Objectives Agency, Office of the Joint Chiefs of Staff, has already issued a number of reports from unit investigators available upon request as well as a great many in preparation.

**An expedited flow of information, in addition to some 60 reports now available on electronics and communications, will soon be forthcoming, it was reported to TELEPHONE ENGINEER by Edwin Y. Webb, Jr., chief of the Communications Unit. Present reports cover phases of German developments in the telephone, telegraph, teletypewriter, standard and television broadcasting and allied fields. R. A. Lumpkin, president of the Illinois Consolidated Telephone Co., headed this work abroad last year.**

Some of the discoveries being made in Germany by American scientific investigators will prove "invaluable" in aiding U. S. manufacturers to clear up some of their own plant problems, it was felt by the government agency, while others, it was maintained, may prove "revolutionary" and institute new fields of production in this country's industry.

In pointing out comparisons between American and German communications some examples, such as the following, were given:

In addition to coaxial cables for television and telephone circuits, with underground repeater stations, it was also stated that Germany had a widespread system of wired radio broadcasting. The wired broadcasting network entered central offices by wire, and programs were then distributed over local subscriber telephone loops and selected by listeners using ordinary radio receivers. Also, it was said, a dial teletypewriter network had been set up which was equipped for 10,000 lines and subscribers could dial any number in any city covered by the network.

Among novel devices found in the Communication Unit's investigations was the Magnetophone, a German sound recorder which used metallized plastic tape, one quarter inch wide, instead of the usual wax record. It was stated a four-inch reel of the tape will run 20 minutes for 10,000 cycle fidelity and for an hour for 5,000 cycles. It was said a reel of tape should not cost more than 50 cents when manufactured in the United States and because of the machine's simplified construction it was pointed out that it would be readily adaptable to office, radio studio and home use. Reproduction was also said to be extremely faithful with the signal noise ratio at about 50 decibels.

**Of interest to manufacturers, a report stated that paper condensers for both alternating and direct circuits were manufactured which replaced the conventional metal foil with a very thin metallic coating applied directly onto the paper dielectric. Condensers were produced which are 40% smaller than the conventional American type, it was said, and can be produced at a 20% reduction in cost. Another advantage cited was that the paper condensers would heal automatically after an electrical breakdown as the vaporized film would evaporate around the point of break and thereby re-establish insulation. Because of this characteristic it was said the condensers can be operated at 30-50% higher voltage than conventional types.**

Investigation of German rural telephone services revealed that, though coverage ranged only from 3-10 percent, principally in villages, rural dial installation in the northern part of the country averaged 80%. It was pointed out, however, that in the central part of Bavaria the dial system covered only 15% of rural telephones. It was also stated that unattended 10 to 20 dial units were available but it was understood little use had been made of them though plans had been made for many installations. (Actually Germany, about the size of Texas, has a much lower telephone density than well-populated U.S. farm areas.

It was stated no developments have been made or planned for carrier over rural telephone or power lines so far as investigators could ascertain.

Toll line dialing equipment was inspected at Hamburg and Munich. The only other city with such equipment was Berlin and it was said that limited use of such system was due to high expense and difficulties with two-wire circuits such as echo and frequency shifts.

### *OPA Utilities Division Opposes Telephone Rate Boost*

The OPA Public Utilities Division this week filed a brief with the Kentucky Public Service Commission opposing the proposed $120,000 a year rate increase by the Lexington, Ky., Telephone Company in connection with its installation of rotary dial service.

The OPA Division brief contended that no rate increase should be allowed at the present time and that the present telephone rates should be maintained for a test period. The brief emphasized that based on past experience, dial service operation results in lower operating costs.

As soon as the transcript becomes available from the Oklahoma Commission, the OPA unit is planning to prepare a brief opposing proposed rate increases by the Southwestern Associated Telephone Co. Both the Lexington and Southwestern Associated companies are part of the General Telephone System.

At the same time, the OPA Division received an interesting legal backing from Federal Judge Louis Goodman at San Francisco who ruled that the OPA could intervene in the rate increase proposal of the San Francisco municipally owned streetcars and buses.

## Getting your radio operator's license made easier

Check your training and knowledge and focus on the key points of theory and practice as covered in Government license requirements, in the quickest, easiest way.

Thousands of men have used the question-and-answer method of this book, in previous editions, to prepare successfully for examinations. Now fully revised to cover new examination procedure. Whether beginner or experienced operator seeking advancement, you too can get invaluable aid from it.

## RADIO OPERATING QUESTIONS and ANSWERS

Chief Instructor, Nilson Radio School, Lieutenant (Technicist) (Communications) U.S.N.R. (Retired)

**and J. L. HORNUNG**

Formerly Radio Instructor, New York University

***415 pages, 5 x 7½, 87 illustrations, $3.00***

This book gives an answer to every question appearing in the FCC publication, Study Guide and Reference Material for Commercial Radio Operator License Examinations. Here is a wealth of concise information on radio communication — theory, apparatus, circuits, laws and regulations, etc.—classified exactly as in the six elements on which all professional radio operator license examinations are based. You spend no time on superfluous material, but get right at the important facts that will help you pass examinations.

**Contents**

1. Basic Radio Laws (62 questions and answers)
2. Basic Theory and Practice (237 questions and answers)
3. Radiotelephone (213 questions and answers)
4. Advanced Radiotelephone (228 questions and answers)
5. Radiotelegraph (232 questions and answers)
6. Advanced Radiotelegraphy (225 questions and answers)

Appendix

I. Operating Abbreviations, Etc.
II. Rules Governing Commercial Radio Operators
III. Extracts from Radio Laws

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## Joins Cook Electric

James R. Downing has been appointed director of research at Cook Electric Company, Chicago, Illinois it was announced by Walter C. Hasselhorn, president.

J. R. Downing

Dr. Downing was born December 8, 1913 at Oxford, Nova Scotia. After completing undergraduate work at Mount Allison and Dalhousee Universities in Canada he attended the Massachusetts Institute of Technology where he received the Doctor of Philosophy degree in 1942, for advanced study and contributions in Physics.

During his period of study at M. I.T., Dr. Downing worked on the development of the cyclotron. Since 1942 his major work has been on the Atomic Bomb project of the Manhattan Engineer District, and in the development of high vacuum equipment for industry. It was during this period that Dr. Downing first became familiar with the activities of Cook Electric Company, who were also engaged in numerous Atomic Bomb projects for the Manhattan Engineer District.

## Hallicrafters Annual Report

The Hallicrafters Company issued its annual report recently for the fiscal year ending August 31, 1945. The report shows earnings of $571,778 for the year, which amounts to 85 cents a share on each of the 675,000 shares of outstanding common stock of the firm. Total sales during the same period amounted to $35,942,771. The report was issued in connection with the annual meeting of stockholders.

The company's peacetime program includes planning for an expanded radio amateur market and for numerous applications of its high precision, high

frequency communications equipment on land, sea and air transportation systems. It is looking forward to a tremendous demand for frequency modulation receivers and television sets.

Featured with "the radio of the future" of Hallicrafters Company is Ellen Matthews whose picture was taken at the recent Hallicrafters preview of new radio equipment in the Stevens Hotel, Chicago.

## Mutual Sold

Sale of the Adair, Fontanelle and Bridgewater exchanges of the Farmers Mutual Telephone Company, Fontanelle, Iowa to the Iowa State Telephone Company of Newton, Ia., has been arranged. The directors of the Farmers Mutual have signed a contract for the sale of all the company's physical assets to the Iowa State concern and the change in ownership will take place March 1.

In making announcement of the sale, officers of the Farmers Mutual issued the following statement: "Officers of the Farmers Mutual have decided it unwise to continue to operate as a small company due to government regulations forcing higher wages and rural electrification which makes necessary the construction of new telephone lines with two wires where one had been sufficient. With advanced costs of materials and labor, it would require an expenditure of several thousand dollars.

"At the present time, over 50 per cent of the company's stockholders live in various parts of the United States and the directors also find it difficult to keep in touch with telephone operating problems due to the fact that they do not live in the vicinity of the home office.

"The Farmers Mutual Company was organized in 1900 and has furnished service to the towns and surrounding communities of Fontanelle, Adair and Bridgewater since that time. It was managed until 1934 by the late F. E. Scars and then by his son, A. E. Scars, who retired as manager Jan. 1, 1945, because of ill health. Since that time, Claude Sivadge has managed the company.

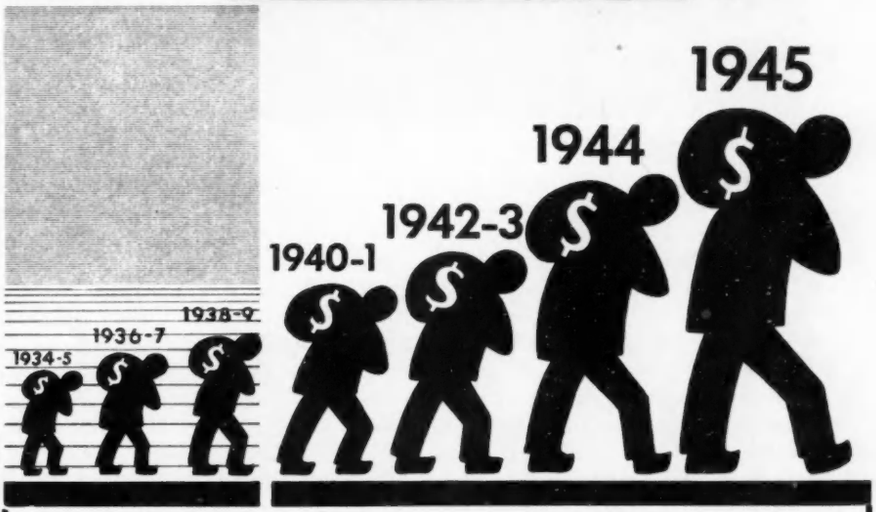
"The policy of the present company all of those years has been to furnish a reasonably good brand of service at a moderate price to the subscribers and pay the stockholders a fair return on their investment. In the 45 years the company has operated, it has never failed to pay a dividend, and has been recognized throughout the state as one of the prosperous and well-managed small companies.

"The Iowa State Telephone Company of Newton owns 37 exchanges in Iowa, including those at Guthrie Center, Bayard, Harlan and Avoca, and the recently purchased Lincoln Mutual exchanges in Greenfield and Stuart. They are known for their good service and excellent public relations.

"All employes will be retained in their present positions by the new owners."

Plans of the Iowa State Company for modernizing and improving the system are to be announced shortly.


# It's a Man-Sized Job




Comparison of Advertising Revenues From Tri-County Tel. Co. (Michigan) Directories

*Loomis Advertising Company took over directory sales at beginning of 1940. From actual case in Loomis files. Full details on request.

TAKING full advantage of the wide opportunities for sale of Telephone Directory advertising is a man-sized job. It requires a clear understanding of the broad opportunities for increased revenue.

Note in the chart above how profits began to take man-sized strides when the Loomis Advertising Company took over advertising sales for the Tri-County Telephone Company at the beginning of 1940.

Any representative listed below will be glad to discuss with you the Loomis plan for increased revenue from telephone directory advertising. Roland T. Beard, Vice-president, Gettle Bldg., Fort Wayne, Indiana, and Wesley H. Loomis, Jr., President, personally invite your inquiry.

Loomis ADVERTISING COMPANY

502 Gettle Bldg., Ft. Wayne 2, Ind.

506 Olive St., St. Louis 1, Mo. 20 West 9th St. Bldg., Kansas City 6, Mo.
Omaha Nat'l Bank Bldg., Omaha 2, Neb., 6908 Market St., Upper Darby (Phila.) Pa.

## Missouri Independent Pioneers Honor Theodore Gary

Acting for the newly formed Theodore Gary Chapter of the Independent Pioneer Telephone Association, R. W. Hedrick (right), secretary of the Missouri Telephone Association, presents a copy of the charter to Theodore Gary, well-known pioneer of the Independent telephone movement.

Organization of the Theodore Cary Chapter of the Independent Pioneer Telephone Association, consisting of Association members throughout Missouri, was officially completed on January 22, 1946, at Columbia, Mo., at a dinner tendered by the Missouri Telephone Company to 27 members and two guests.

The new chapter is named in honor of the founder of the Gary Group of telephone enterprises, Mr. Theodore Gary, whose long and vigorous career in the interest of the Independent telephone movement began in the early years of the century with the formation of telephone companies in various parts of Missouri and Kansas.

Charter members of the chapter number 56 individuals. At the organization meeting, R. W. Hedrick, secretary of the Missouri Telephone Association, read the by-laws and charter of the chapter, which were approved by those present and adopted on behalf of the membership. The following officers and directors were then elected:

President: C. W. Gottry, Missouri Telephone Co., Columbia.

Vice President: J. R. Carter, The Home Telephone Co., Perry.

Secretary: J. M. Roberts, Inter-County Telephone Co., Gallatin.

Treasurer: Helen McKee, Missouri Telephone Co., Columbia.

Directors: G. A. Hearne, Central Missouri Tel. Co., Warrensburg; R. W. Hedrick, Missouri Telephone Assn., Jefferson City; Jesse Kent, Huntsville Telephone Co., Huntsville.

First official act of the chapter after its organization was the formal presentation to Mr. Theodore Gary of a framed duplicate of the charter. The presentation ceremony took place on Tuesday, January 29, at Mr. Gary's office in Kansas City, in the presence of a gathering of members and friends. Those present included Hunter L. Gary, Reno, Nev.; C. W. Gottry, Columbia, Mo.; R. W. Hedrick, Jefferson City, Mo.; J. M. Roberts, Gallatin, Mo.; G. A. Hearne, Warrensburg, Mo.; J. J. Moran, Plattsburg; and Carl L. Spaid, Kansas City.

A brief presentation address was made by R. W. Hedrick, who paid warm tribute to Mr. Gary as one of the telephone industry's outstanding pioneers, whose courage, determination, and keen judgment during his long and active association with the Industry left a deep and lasting impression on its affairs and contributed so much to its present soundness and vigor. Mr. Gary, deeply moved by this recognition of his contributions to Independent telephony, expressed his great pride and pleasure at being so honored.

Mr. Gary has his home at Macon, Mo., where he formed his first telephone company some forty years ago. Though he has retired from active participation in Theodore Gary And Company, he is a frequent visitor to the company's Kansas City office and retains the keenest interest in the welfare of the industry with which he was actively identified for so many years.

## Sales Authorized

Alabama Public Service Commission on January 30 authorized D. W. and Emmie D. Eiland, owners of Georgiana (Ala.) Telephone Co., G. A. and Georgena H. Crenshaw, owners of Greenville (Ala.) Telephone Co. and Gus J. and Ruby R. Bryan, owners of Opp (Ala.) Telephone Co., to sell to James L. Kirk. Both exchanges will be operated under the name of United Telephone Co. and rates now in effect are to continue.

## IRE Holds Record Winter Meeting

Approximately 4500 scientists, engineers and technicians in the radio and electronics fields—an increase of 1500 over last year's attendance—were present for the largest radio engineering show ever staged at the 1946 Winter Technical Meeting of the Institute of Radio Engineers in New York. The 170 exhibits of 135 companies, also the record in exhibitors at the IRE meetings, displayed a panorama of the postwar world's radio, radar and electronics equipment.

In the principal address at the annual banquet Jan. 24, Dr. Frank B. Jewett, president of the National Academy of Sciences and retired A. T. & T. vice president and Bell Laboratories chairman, sounded the keynote of the prospects for enlargement and change in industrial research resulting from the war, both in the development of electronics, chemistry, metallurgy and applied biology. He emphasized the influence of industrial research on the organization and expansion of industry and cited that the powerful position through which the United States was able to cope with the problems of World War II had come through the rapid growth of industrial research organizations in a wide and expanding sector of industry, which had had its genesis following World War I. Dr. Jewett gave some interesting observations on the future of scientific and technical education and on the question of proper governmental support and control of scientific development.

## Stock Ordered Sold

District Judge Harry Ankeny at Lincoln, Nebraska last month decreed that 700 shares of the Nebraska Central Telephone Company at Gibbon, Nebraska be sold at sheriff's sale, pledged as security to the Live Stock National bank at Omaha as security for $6,825 indebtedness. The court specified that the shares were wrongfully and unlawfully offered.

## Collins Promoted at Manitoba System

E. R. Collins

E. R. Collins succeeded H. M. Kerr as district superintendent of Western Manitoba for the Manitoba (Canada) Telephone System on February 1. Mr. Kerr is retiring under the Manitoba pension plan, and Mr. Collins, who started in the telephone business in 1904 and was wire chief at Brandon from 1919 to 1944, well deserves this promotion which puts him in charge of Western Manitoba for the Manitoba System. Mr. Collins was plant superintendent during 1945.

He reports that he has seen the changes take place in the telephone industry from open wire to cable, aerial to underground and from the Blake transmitters to the modern handset. In addition to his telephone experience, Mr. Collins took part in the building and operation of three radio stations and has been classed as a Radio Engineer for the last fifteen years while he occupied the position of toll wire chief with a 3,000 line automatic exchange.

Mr. Collins has long been active in the industry and has authored interesting and technical articles for the TELEPHONE ENGINEER publications.

## New Ownership

Southern Bell Telephone & Telegraph Company was authorized recently by North Carolina Utilities Commission to acquire ownership of Garner (N. C.) Telephone Company by paying M F. Hosea, L. C. Penny and E. R. Penny, present owners, $5,000.00 New rates are to apply upon Southern Bell's acquisition of the plant. A modern telephone plant is to be built to replace the present one.


"and that's that"

...because he used Amertel

This typical American expression of finality describes exactly how telephone men feel when they string Amertel wire. They know that sound engineering and lasting construction calls for the very qualities offered by Amertel galvanized iron or steel wire.

This is true regardless of weather and local conditions for there's an Amertel wire for the longest span or the shortest span . . . for the heavy loading zone and the light loading zone.

Plan now to take advantage of this extra strength and quality that's in every inch of Amertel . . . it helps do away with repairs, replacements and service calls. The job is done—"once and for all"—when you use Amertel.

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## Reduce Toll Rates

Reduction in toll telephone message rates in Inyo and Mono Counties, for California intrastate toll telephone messages interchanged with Southern California Telephone Company, will result in annual savings for toll users of $71,300, L. Harold Anderson, president of the California Railroad Commission recently announced.

The Interstate Telegraph Company was authorized to adopt and make effective the new reduced rates by January 20, 1946. Of the $71,300 annual reduction, a total of $57,700, is applicable to intrastate traffic and $13,600 is applicable to Pacific Coast interstate traffic.

The reduction resulted from studies initiated in 1943 between the Railroad Commission and Interstate Telegraph Company, looking toward a solution of the other-line toll rate situation. After study and consideration of several rate plans, the introduction of direct rates in Inyo and Mona Counties for intrastate traffic and direct rates throughout the entire system on interstate traffic to Pacific Coast points was the plan selected as the initial step in making direct rates effective over the entire system.

## Incorporated

Telephone Interviews, Inc., Kings, New York, is now incorporated and manufactures electric transmitting and receiving sets.

## Redi-Files by Remington Rand

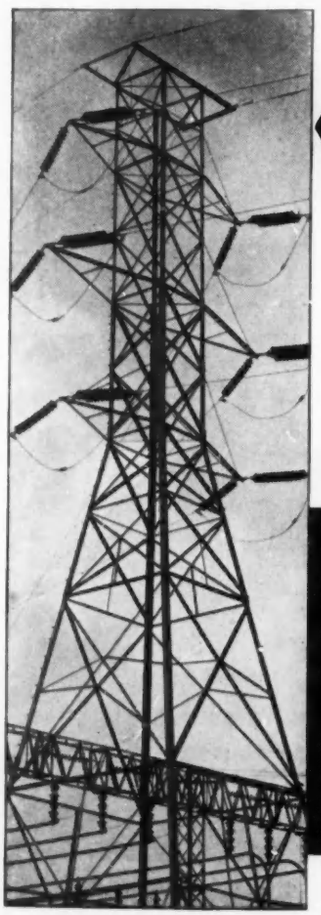
Redi-File, a newly developed type of hanging file folder, to increase efficiency of executives' personal files as well as general files, is a new product of Remington Rand, Inc. Tailored to fit any size desk drawer, it gives executives fingertip accessibility of working papers. Easy-to-read angle tabs on hanging folders make papers easy to locate. The arrangement of the folders requires no follower block to hold papers upright.

Redi-File fits any standard filing drawer and requires no revision of present filing system. Variadex or other filing methods—alphabetic, subject, numeric, or Soundex—can be used with Redi-Files, thereby conserving the advantages of the filing method used while adding the mechanical advantages of Redi-File folder suspension. These mechanical advantages include: uniform height of tabs in their preselected positions; avoidance of sagging and slumping of folders; ease of removal and replacement of folders; wide V-opening for scanning folders and filed papers for quick reference; and extremely rapid location of folders and individual documents.

Constructed of durable Remcraft stock with metal hangers and tabs, these folders far outwear other types. Tabs are available in a variety of sizes. Prices, descriptions, and specifications can be obtained by postcard request to New Products Editor, Telephone Engineer Publ. Corp., 7720 Sheridan Rd., Chicago, Ill.

## Plant Rehabilitation Ordered

Upon complaints from subscribers of poor service provided, the Southeastern Telephone Company was ordered in January by the Georgia Public Service Commission to repair, rehabilitate and replace its outside plant, central office equipment, drop and block wires and station apparatus necessary to insure provision of efficient, adequate and dependable service in Ashburn, Sycamore, Mt. Vernon and Ailey, Georgia. Monthly reports are to be submitted by the company, listing all materials used and improvements made in each community. Failure to comply with this order will cause the commission to reduce rates substantially commensurate with service, without further hearing or notice.

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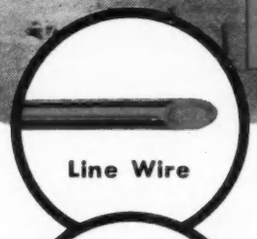

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WANTED: Plant Superintendent for large telephone property. Good salary for man having qualifications. In replying, furnish complete information as to age, education, experience, present employment, draft status, small photograph, recommendations, etc. Write Telephone Services, Inc., 16th Floor, Lincoln Tower, Fort Wayne 2, Ind.

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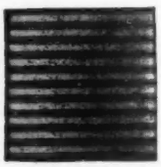

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**WANTED: Telephone Accountant—qualified to supervise all phases of telephone accounting for Class A companies. Give full information as to age, experience, draft status, etc. Attach small photograph. Telephone Services Inc., 16th Floor Lincoln Tower, Fort Wayne, Indiana.**

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U. S. Rubber's C. W. Higbee, manager of the wire and cable department, congratulates John Alles, city electrician of Wilkes-Barre, Pa., on his election to the presidency of the Innternational Municipal Signal Association at the recent annual convention of the association in Chicago.

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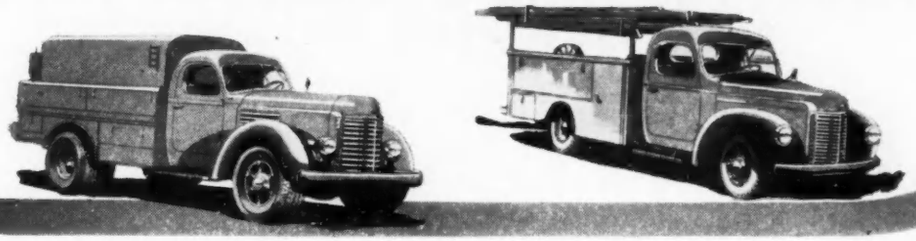

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